

Greening Supply Chains in China: Practical Lessons from China-based Suppliers in Achieving Environmental Performance

MA JUN (IPE), RAY CHEUNG (WRI), WANG JINGJING, (IPE) RUAN QINGYUAN (IPE)

World Resources Institute Working Papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback and to influence ongoing debate on emerging issues. Most working papers are eventually published in another form and their content may be revised.

Suggested citation: Ma, Jun, Cheung, Ray, et al. October 2010. "Greening Supply Chains in China: Practical Lessons from China-based Suppliers in Achieving Environmental Performance." WRI Working Paper. World Resources Institute, Washington, DC.

CONTENTS

I. Introduction.....	1
II. What are "Green Supply Chains"?	2
What are the drivers of Green Supply Chains?	2
How are leading companies implementing Green Supply Chain strategies?	3
How do global Green Supply Chain strategies impact Chinese suppliers?	3
How are domestic pressures for Green Supply Chains impacting Chinese suppliers?	5
What challenges do Chinese suppliers face in improving their environmental performance?	7
III. Case Studies - Examples of Green Supply Chains in China.....	8
IV. Conclusion.....	20
V. References.....	20

I. INTRODUCTION

Leading corporations all over the world are making environmental performance part of their core business strategy. As part of their efforts, international companies are implementing green supply chain initiatives, under which they require their suppliers to meet certain environmental performance standards. While these green supply chain requirements are starting to have global ramifications, the impacts are particularly significant for Chinese industry because of China's role as the world's factory and leading global exporter – accounting for as much as 10 percent of the world's total exports. Chinese suppliers therefore face new challenges: If they do not meet the environmental requirements of green supply chain buyers, they risk losing their international customers.

The purpose of this report is to highlight examples of five companies operating in China by illustrating the approaches they have adopted to address environmental problems. The report focuses on water pollution within China's challenging business landscape.

The five case studies presented specifically illustrate:

- Management processes adopted by China-based suppliers.
- Low-cost solutions that lead to effective results.
- Companies that improved their performance after environmental violations.
- The role of multistakeholders and independent third parties as drivers for supplier environmental performance.

All five companies highlighted in the best-practice case studies were independently reviewed and selected by the Green Choice Alliance (GCA), a consortium of Chinese environmental experts and nongovernmental organizations (NGOs). The five companies were among the 290 suppliers that were prepared to communicate with NGOs and the public about their environmental performance.

The cases featured in this report were chosen based on the following criteria: 1) the representative nature of the environmental problem; 2) the practicality and effectiveness of the management processes used to solve the environmental problem; and 3) the potential for management processes to be widely adopted by Chinese suppliers in various industries.

It is the authors' hope that through these case studies Chinese suppliers will gain insights into how they can become green suppliers, enabling them to strengthen their relationships with international buyers and achieve business success.

October 2010

II. WHAT ARE “GREEN SUPPLY CHAINS”?

Green supply chains refer to the process by which suppliers and buyers reduce the environmental impacts throughout the value chain, including product design, material selection, manufacturing process, transportation of goods, and the recycling and disposal of used goods.

Environmental goals include:

- Reducing the consumption of energy, water and natural resources.
- Increasing the use of clean and renewable energy sources.
- Decreasing waste production and pollution emissions.
- Improving the treatment of waste byproducts.

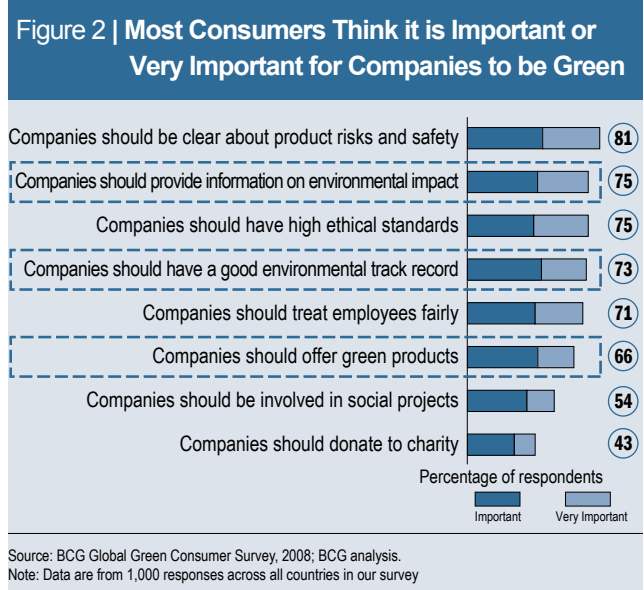
Figure 1 | Operational Impacts of Green Supply Chains

Strategy	Operational Impact	Environmental Impact
Optimize Material Use	Less Scrap	Reduced Solid Waste
Reduce Inventory	Less Chemical Spoilage	Reduced Hazardous Waste
Reduce Overproduction	Less Runtime	Energy Savings
Reduce Transportation	Less Fuel Consumption	Reduced Air Emissions

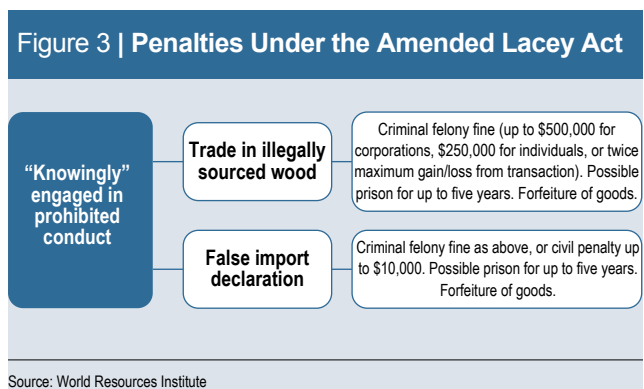
Source: US EPA Green Supplier Network (<http://www.epa.gov/greensuppliers>)

WHAT ARE THE DRIVERS OF GREEN SUPPLY CHAINS?

• **Market Demand: Consumer demand for environmentally friendly products is increasing. Companies are seeking to capture this market opportunity by minimizing their environmental impacts and/or selling environmentally friendly products.** A global survey conducted by Boston Consulting Group in 2009 of more than 9,000 consumers, including those in China, found that 73 percent of consumers consider it important that companies have good environmental records and a majority of those respondents are willing to pay a premium of 5 percent or more for green products. As a result, retailers and buyers are including environmental standards in their sourcing codes. (See Boston Consulting Group’s “Capturing Green Advantage for Consumer Companies” at <http://www.bcg.com/documents/file15407.pdf>)



• **Regulatory Pressure: New government policies are prohibiting products made from environmentally destructive materials and polluting processes. Companies that utilize environmentally destructive and/or polluting processes will not be able to sell their goods, and company owners may be subject to financial penalties and criminal prosecution.** For example, the 2008 Amendments to the Lacey Act in the United States prohibit all plant-made products, like furniture, paper, and lumber, that are illegally sourced from old-growth or tropical rain forests, either in the United States or a foreign country. Companies and individuals that violate the law face severe penalties, including forfeiture of goods and vessels, fines, and imprisonment. (See World Resources Institute’s “Factsheet: Are You Ready for the Lacey Act?” at <http://www.wri.org/stories/2009/12/fact-sheet-are-you-ready-lacey-act>)



Box 1: EXAMPLES OF GREEN SUPPLY CHAIN STRATEGIES AT LEADING INTERNATIONAL CORPORATIONS

Retail: Walmart is the world's largest corporation and retailer with over 8,400 stores in 15 countries, 2 million employees and 100,000 suppliers. As part of its corporate goals, the retailer seeks to:

- be supplied 100 percent by renewable energy.
- create zero waste.
- sell products that sustain natural resources and the environment.

To achieve these goals, Walmart has launched a series of initiatives, including:

- Designing and opening a viable store prototype that is 25 percent to 30 percent more energy efficient and will produce up to 30 percent fewer carbon emissions globally compared to its 2005 baseline;
- Reducing carbon emissions at its existing stores, clubs and distribution center bases around the world by 20 percent by 2012;
- Doubling its truck fleet efficiency in the U.S. by October 2015;
- Reducing packaging by 5 percent globally by 2013 from its 2008 baseline;
- Working with suppliers to make products 25 percent more energy efficient by January 2011 from its 2008 baseline.

Walmart has established Sustainable Value Networks (SVNs) to design and implement its corporate sustainability strategy. The SVNs consist of Walmart employees of all levels; work with nongovernmental organizations, academics and suppliers, to improve the company's environmental performance; and report directly to the Chief Executive Officer.

Source: Walmart 2010 Sustainability Report (<http://walmartstores.com/sustainability/7951.aspx>)

Manufacturing: General Electric (GE) is one of the world's leading corporations. Its products and services range from jet engines, power generation, water processing, to medical devices. It operates in more than 100 countries and has over 300,000 employees. GE has launched the following sustainability goals under its "ecomagination" initiative:

- Develop and sell innovative products and services that are solutions to environmental challenges.
- Improve energy intensity by 30 percent by 2012 from its 2004 baseline level.
- Reduce water use by 30 percent by 2015 from its 2006 baseline.

To achieve these goals, GE has launched a series of initiatives, including:

- Doubling research and development investment into ecomagination from US\$5 billion to US\$10 billion by 2015;
- Conducting an "energy treasure hunt process" which engages employees to identify projects that drive energy efficiency;
- Reducing the water consumption of its facilities by improving valve operation, replacing older single-speed pumps with new variable frequency drive pumps, control valves and closing loop cooling opportunities.

GE has established an ecomagination advisory board that counsels the ecomagination team on critical environmental and business issues. The board includes thought leaders from environmental nongovernmental organizations, academics, and business leaders from other industries, and provides opportunities for them to learn more about GE's activities.

Source: GE Ecomagination 2009 Report (<http://ge.ecomagination.com/report.html>)

Logistics: UPS is one of the world's largest logistics and freight companies, operating in more than 200 countries and territories with the ninth largest airline in the world. It ships 1.5 million packages a day with the value of the goods handled by the company worth nearly 2 percent of the world's GDP. UPS established a corporate goal to reduce its carbon emissions per one ton of cargo flown by 20 percent from 2005-2020.

To achieve this goal, UPS is implementing initiatives in three focus areas:

- Operating more fuel-efficient aircraft types and engines;
- Implementing fuel saving operational initiatives;
- Introducing biofuels as a replacement for fossil fuels.

To drive its strategy, UPS has created a Sustainability Steering Committee that includes six members of the UPS Management Committee and 11 other senior managers. The company's sustainability team is dedicated to implementing the strategy by collecting data, monitoring key performance indicators, and reporting strategic activity and achievements.

Source: 2009 UPS Corporate Sustainability Report (<http://www.responsibility.ups.com/Sustainability>)

Figure 4 | Impact of Environmental Factors on Energy

Issue	Description	Price Impact
Climate Change Policy	Price for carbon dioxide emissions will raise the cost of all fossil fuels combusted for energy. It will also drive investments in efficiency, alternative fuels, and new infrastructure over the long term to lessen price impacts.	↑
Physical Climate Change / Water Scarcity	Extreme climate events will likely cause increasing disruptions and could raise prices in the short term.	↑
	May impact some power plants in water-scarce regions. May change priorities regarding future hydro development.	↑
Deforestation	Not likely to have a direct impact.	↔
Biofuel Policy	Biofuel consumption offsets gasoline and diesel consumption and lessens demand pressures on oil price. A rollback of biofuel policies in major markets may increase gasoline and diesel consumption and have the opposite impact on oil price.	↑↓

Source: World Resources Institute and AT Kearney

• **Economic Competitiveness: Environmental factors can significantly raise energy and raw material prices, increasing operating costs.** One study by the World Resources Institute and global consultancy AT Kearney estimated that worldwide prices of oil, natural gas, and electricity in 2018 could increase respectively by 22 percent, 50 percent, and 45 percent from a 2008 baseline. The price increases were driven by a scenario of more stringent climate change regulations, growing water scarcity in key agricultural regions, restraining biofuel policies, and greater consumer demand for green products. For fast-moving consumer goods companies producing food, beverages, and household items, these environmentally related cost increases could reduce company earnings before interest and taxes from 19 percent to 47 percent. (See AT Kearney and World Resource Institute’s “Rattling Supply Chains” at <http://www.wri.org/publication/rattling-supply-chains>)

HOW ARE LEADING COMPANIES IMPLEMENTING GREEN SUPPLY CHAIN STRATEGIES?

In recognition of the challenges that environmental factors can pose to their businesses, the leaders of an increasing number of multinational companies are integrating environmental management into core corporate strategy. A 2010 global survey by an independent not-for-profit organization, the Carbon Disclosure Project, of more than 1,200 companies in sectors ranging from consumer staples and industrials to materials, found that 63 percent of the companies surveyed had a corporate climate change strategy. Over 90 percent of these compa-

nies had either a board committee or another executive body overseeing the implementation of climate change strategy to ensure that it was effectively turned into action within the company. (See Carbon Disclosure Project’s “Supply Chain Report 2010” at https://www.cdproject.net/CDPResults/CDP-Supply-Chain-Report_2010.pdf)

HOW DO GLOBAL GREEN SUPPLY CHAIN STRATEGIES IMPACT CHINESE SUPPLIERS?

• **Loss of Business: With China as the world’s factory and leading global exporter – accounting for as much as 10 percent of the world’s total exports – the impact of green supply chain strategies by multinational corporations will be substantial. Chinese suppliers that are unable to meet the environmental performance standards of green supply chain companies may not be able to continue to do business with such firms.**

For example, Walmart announced that it will no longer purchase from Chinese suppliers with poor environmental performance records. In order to be a supplier to Walmart, Chinese companies must now provide certification of their compliance with China’s environmental laws and regulations. Walmart also conducts audits on a factory’s performance against specific environmental criteria, such as air emissions, water discharge, management of toxic substances and hazardous waste disposal. These actions are extremely significant as Walmart procures from over 10,000 Chinese suppliers.

• **Increased Scrutiny:** Many multinational corporations are using environmental performance as part of their scoring system for choosing Chinese suppliers. While price, quality, and delivery time remain key criteria, environmental performance can be a decisive factor in a supplier’s success in winning a purchasing contract.

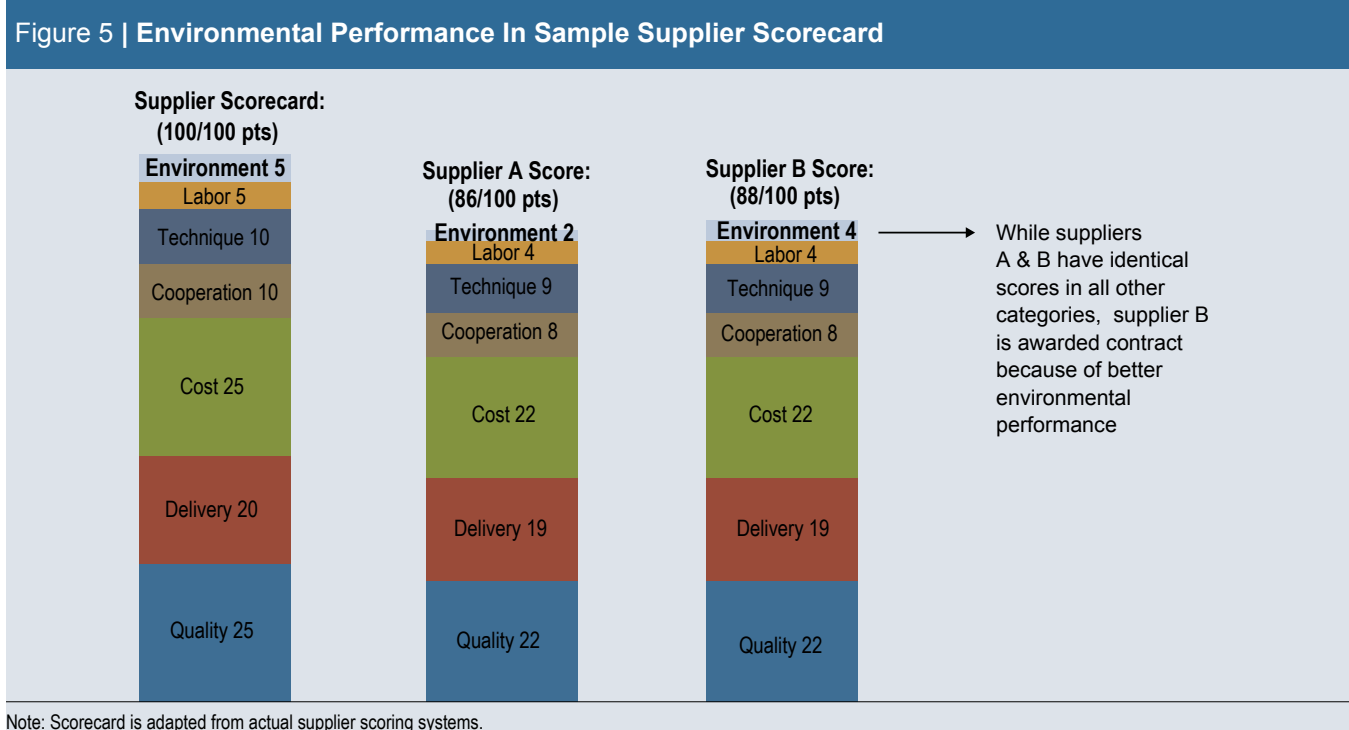
For example, as demonstrated in Figure 5, two Chinese companies (Supplier A and Supplier B) score exactly the same on cost, delivery, and quality in a supplier scorecard. However, Supplier B’s stronger environmental record ultimately provides an additional advantage in its selection by the multinational buyer, despite environmental performance accounting for a relatively small 5 percent of total scorecard points.

HOW ARE DOMESTIC PRESSURES FOR GREEN SUPPLY CHAINS IMPACTING CHINESE SUPPLIERS?

• **Government intervention:** The Chinese government is using business mechanisms to enforce environmental regulations on Chinese manufacturers. For example, the State Council is directing key government agencies, including the National Development and Reform Commission, the Ministry of Finance, and the Ministry of Environ-

mental Protection to prohibit tax incentives, restrict exports and raise fees for energy intensive and polluting industries, such as steel, cement, and minerals extraction. The People’s Bank of China and the Ministry of Environmental Protection are also working with local Chinese banks to implement the Green Credit program, which prevents loans to Chinese firms with poor environmental performance records. In addition, the National Development and Reform Commission and the Ministry of Finance have issued a notice to all Chinese central and local governments to purchase goods from suppliers that are energy efficient. Furthermore, on a local level, governments have developed preferred supplier lists for companies producing environmental-friendly products for their purchasing needs.

• **Public pressure:** Chinese nongovernmental organizations are actively monitoring the environmental performance of Chinese suppliers. For example, local Chinese citizen groups as well as international environmental organizations are exposing polluting suppliers to consumers, international buyers, and the domestic and international media with the aim of forcing the polluters to improve their behavior. (See Box on the China Water Pollution Map and the Green Choice Alliance).



Box 2: CHINA WATER POLLUTION MAP AND THE GREEN CHOICE ALLIANCE

The *China Water Pollution Map* is China's first online national pollution monitoring tool that links publicly available data on local pollution infractions to specific company names and locations. The data are embedded in an interactive, user-friendly map. Managed by the environmental nongovernment organization, the Institute for Public and Environmental Affairs (IPE), the online map and database contains over 70,000 specific citations (as of September 2010) of companies violating emission standards and other environmental rules in China since 2004. It is continually updated, so that Chinese citizens can use the map's search engine to check whether firms have been cited for poor environmental performance.

Building on the China Water Pollution Map, in August 2008 IPE established the Green Choice Alliance (GCA), a consortium of Chinese environmental experts and nongovernmental organizations representing local community members, to work with multinational buyers to independently track the compliance records of their Chinese suppliers and to facilitate corrective actions and public disclosure. To support this effort, in October 2008 IPE launched the *China Air Pollution Map* which features 19,000 specific citations as of September 2010. Multinational buyers such as Nike, Walmart, Esquel, and Unilever are currently working with the GCA and using the China Water and Air pollution maps to monitor and manage their environmental sourcing practices in China. As a result, more than 290 Chinese suppliers who were cited as environmental violators have received public and business pressure to take corrective measures and disclose their environmental performance to the public.

The China Water and Air Pollution Maps and the Green Choice Alliance are based on the premise that the biggest obstacles to China's environmental problems are neither technical nor financial, but rather the lack of social determination. Only when society has the motivation to solve its environmental problems, will technical and financial resources be brought to bear. For Chinese industry, weak regulatory enforcement and a nascent judicial system has encouraged many polluters to simply ignore their environment impacts or pay fines without taking the necessary corrective actions. To break this cycle of behavior, active public participation is needed to support China's environmental regulatory infrastructure and create the

necessary social will to drive environmental performance. By doing so, industry will be motivated to adopt the necessary management, technical, and financial measures to operate in a sustainable manner.



China Water Pollution Map (<http://www.ipe.org.cn>)

WHAT CHALLENGES DO CHINESE SUPPLIERS FACE IN IMPROVING THEIR ENVIRONMENTAL PERFORMANCE?

Despite increasing pressures to improve their environmental performance, Chinese suppliers face many challenges to operating in a more sustainable manner, not least their ability to make the necessary investments to meet green supply chain standards. Key financial challenges include:

- **Extended green investment “payback”:** While improving resource consumption, such as energy and water, provides long-term cost savings, the payback for making such environmental investments may be as long as three years, which is financially impossible for many Chinese suppliers.
- **Lack of financial incentives from green supply chain buyers:** Multinational buyers are often unwilling to change purchasing commitments and long-term purchasing contracts to Chinese suppliers that make the investments to improve their environmental performance.

- **Rising operational costs:** Chinese suppliers face rising resource and labor costs. For example, factory wages have increased at an average annual rate of 25 percent during 2007 to 2010. Rising costs dissuade suppliers from making environmental investments which may raise operating costs.

- **Limited access to finance:** The majority of Chinese suppliers are small and medium-scale enterprises (SMEs) with limited access to formal financing channels such as bank loans. Chinese SMEs account for less than 10 percent of all bank lending in China, and as a result, Chinese suppliers frequently do not have the capital to make the necessary environmental investments.

- **Intense domestic and global competition:** Chinese suppliers face intense competition from thousands of firms, both domestic and international, within their industries. This intense competition puts constant pressure on suppliers to cut costs, which can include environmental protections, in an effort to stay in business.

III. CASE STUDIES – EXAMPLES OF GREEN SUPPLY CHAINS IN CHINA

The case studies in this report aim to provide Chinese suppliers with actual examples of how to become a green supplier. They highlight practical and creative approaches that the selected suppliers have adopted to address environmental performance within the challenging business landscape in China. The examples focus on water pollution as this is one of the country's most significant environmental problems. Some 320 million people lack access to clean drinking water, 70 percent of lakes and rivers are polluted, and major pollution incidents happen on a near-daily basis. The World Health Organization recently estimated that nearly 100,000 people die annually from water pollution-related illnesses in China, and 75 percent of disease comes from water quality-related issues.

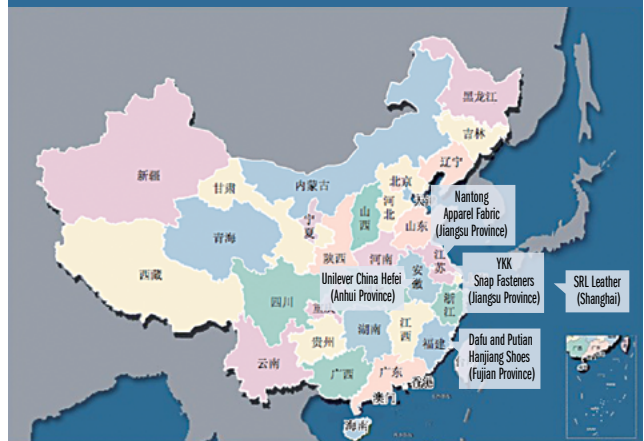
The five case studies presented specifically illustrate:

- **Management processes rather than the technical measures adopted by China-based suppliers.** By highlighting successful qualitative techniques, owners and senior managers of Chinese suppliers can develop their own environmental management plans.
- **Low-cost solutions that lead to effective results.** China's manufacturing industry on average is much less efficient in its energy and water use than its peers in developed countries. As a result, there exist many simple and cost-effective opportunities in pollution control that Chinese firms can adopt. According to the World Bank, China's water use per unit of industry-added value in 2003 was 5 to 10 times the level of developed countries, and China's water recycling level is on average only 40 percent compared with 75 percent to 85 percent in developed countries.
- **Companies that improved their performance after environmental violations.** By showing how environmental violators became green, Chinese suppliers with poor environmental records are encouraged to improve their performance.
- **The role of multistakeholders and independent third parties as a driver for supplier environmental performance.** By focusing on the role of NGOs and other independent third-party entities in monitoring environmental

Figure 6 | China-based Suppliers Featured in the Case Studies

Firm Name (Location)	Industry	Environmental Issue
Nantong Apparel Fabric (Nantong, Jiangsu Province)	Garment	Industrial Waste-Water, Energy Consumption
Dafu and Putian Hanjiang Shoes (Putian, Fujian Province)	Shoes	Industrial Waste-Water, Sanitary Waste
Unilever China Hefei Factory (Hefei, Anhui Province)	Consumer Goods	Industrial Waste-Water, Biological and Chemical Waste
SRL Leather (Shanghai)	Leather Tannery	Air Pollution
YKK Snap Fasteners (Wuxi, Jiangsu Province)	Electroplating	Industrial Waste-Water, Solid and Heavy-Metal Waste

Figure 7 | Location of Company Case Studies



compliance, Chinese suppliers can help other stakeholders overcome the challenges of becoming a green supplier.

Methodology

All five companies highlighted in the best practice case studies were independently reviewed and selected by the Green Choice Alliance. The companies were among the 290 suppliers that were prepared to communicate with NGOs and the public about their environmental performance.

The cases featured in this report were chosen based on the following criteria: 1) representative nature of environmental problem; 2) the practicality and effectiveness of the management processes used to solve the environmental problem; and 3) the potential for management processes to be widely adopted by Chinese suppliers in various industries.

Figure 8 | Practical Management Lessons from the Case Studies

Situation	Action Taken	Challenge Resolved
Identify environmental problem	Engage key stakeholders – the government, customers and citizen groups – to identify environmental problems and find solutions.	Receive input to create solutions that reduce the costs of environmental investments; gain financial support for improvements; strengthen business relationships with buyers.
	Use critical and professional feedback from third-party stakeholders to break a “business as usual” mindset.	External feedback and criticism presents an opportunity to drive structural and operational changes that can improve a firm’s environmental performance and its operational efficiencies in both the immediate and long term.
Implement solution	Evaluate opportunities to replace the manufacture of highly polluting products with environmentally friendly alternatives.	New environmentally friendly products may reduce environmental investment costs, increase margins and establish a closer purchasing relationship with buyers.
	Leverage the demands of international business and the threat of local job losses to command local government support for improvements in environmental performance.	Local government support can help lower the cost of a supplier’s environmental investments when a strong case is made that support will improve the economic development of a particular region.
	Work with government to optimize the use of existing local environmental infrastructure.	Connecting to local public environmental waste treatment infrastructure can significantly reduce the supplier’s environmental investment costs and lead to significant improvements in environmental performance.
Monitor progress	Establish open and transparent communication about environmental performance with local communities and public interest groups.	In the face of public pressure, an open dialogue with the local community and environmental organizations and public disclosure of environmental performance can build trust, rehabilitate a company’s reputation, and create a more favorable operating environment.

All information presented in the case studies has been sourced from publicly available information, such as official government records and purchasing databases; and/or provided by or with the permission of the featured companies. Information related to the company’s confidential business operations have been omitted.

CASE STUDY I: PRODUCT INNOVATION LEADS TO BETTER ENVIRONMENTAL PERFORMANCE AND ENHANCED COMPETIVENESS

Nantong Yiyi Interlining Company

Located in Nantong City, Jiangsu Province, Nantong Yiyi Interlining Company (Nantong Yiyi) is a privately owned manufacturer of fabrics, dyeing chemicals, fiber setting, and coatings for high-end clothing producers. With an annual production capacity of more than 60 million meters of cloth, the firm's buyers include at least 20 China-based garment manufacturers of high-end clothing brands whose products are exported to markets in Asia, Middle East, Europe, and the United States.

Quick Facts: Garment Industry

The garment industry is one of China's most competitive sectors with hundreds of thousands of companies, of which only approximately 50,000 have annual sales of at least RMB5 million. According to the China National Textile and Apparel Council, two-thirds of all the companies in the sector have operating margins of less than 1 percent. The industry is also one of China's most polluting sectors. In 2007, the industry's waste water discharges exceeded 2.2 billion tons, accounting for 10 percent of China's total industrial wastewater pollution. As of September 2010, the China Water Pollution Map had more than 3,000 garment companies listed as environmental violators. In 2009, the State Council announced a revitalization plan for the garment industry, which seeks to drive efficiencies in the sector and reduce its pollution emissions and energy consumption.

Environmental Problem

In June 2007, Nantong City Environmental Protection Bureau issued Nantong Yiyi a code red violation, indicating that the company had violated national environmental standards. The government sanction led to its placement on the China Water Pollution Map. As a result of its listing, one of its buyers, the Esquel Group – a Hong Kong-based clothing manufacturer – discovered Nantong's environmental noncompliance in July 2008 and requested that Nantong Yiyi take internal corrective action. In response to the

request from the Esquel Group, Nantong Yiyi contacted the Green Choice Alliance (GCA) to remove its violations record from the China Water Pollution Map. The GCA informed Nantong Yiyi that such action required an independent verification of the corrective actions, which Nantong Yiyi agreed to conduct. In March 2009, the GCA and an independent international environmental consulting firm conducted a third-party audit of the company. The environmental audit found that the company's effluent discharges exceeded the local environmental regulation's permissible Chemical Oxygen Demand (COD) levels. It also found that the main source of COD pollutants originated from the production of one low-quality lining fabric, which also consumed disproportionately large amounts of water.

Solutions Implemented

Nantong Yiyi did not believe it was economically viable to invest in the appropriate environmental clean-up measures for the production of the low-quality lining fabric because of very low profit margins. However, with ongoing pressure from the Esquel Group to resolve its noncompliance issue, Nantong accepted the recommendation of the environmental consulting firm to replace the polluting product line with a less water-consuming and water-polluting fabric. The company also decided to improve its recycling system for processed water. While Nantong Yiyi initially financed the environmental investments itself, the company with the help of Esquel was able to receive grants from the local and Hong Kong governments toward environmental improvements.

As a result of these measures, Nantong Yiyi increased its water use efficiency by one-third and significantly reduced its COD discharges to comply with the regulatory COD levels, which were independently verified by the GCA in July 2009. In addition, the company's manufacturing system received ISO 14000 certification, the global industry-rating system for production processes with environmental management systems.

Environmental Benefits

- Reduced the COD levels of its effluent discharges to be in compliance with environmental regulations.
- Improved water-use efficiency by one-third, cutting annual water consumption by 40,000 tons.
- Reduced energy consumption by 400 tons of coal equivalent a year by recycling of high-temperature water.

Economic Benefits

- Reduced its RMB1.4 million environmental investment cost by receiving RMB430,000 in government grants. These included a RMB400,000 grant from the local government for pollution reduction and a RMB30,000 grant from a special fund of the Hong Kong government supporting Hong Kong companies in the upgrade of their mainland China operations.
- Secured a payback period of 2.3 years for its environmental clean-up investments as a result of lower water consumption and energy costs. This included a reduction of annual water consumption costs by RMB120,000 and energy costs by RMB300,000.
- Strengthened its supplier relationships with its buyers because of its new environmentally friendly product offerings.

KEY LESSONS

- **Engage key stakeholders – the government, customers and citizen groups – to identify innovative solutions and gain financial support.** By responding to buyer pressure and conducting an independent audit, Nantong Yiyi's experience highlights how suppliers can draw on external advice to identify and implement cost-effective solutions to environmental challenges. Such nonconfrontational engagement fostered a stronger relationship between the supplier and its buyers, and led to financial support from the government for environmental investments, ultimately reducing the pay-back time from the water and energy cost savings.
- **Evaluate opportunities to replace the manufacture of highly polluting products with environmentally friendly alternatives, to address environmental problems in an effective and cost-efficient manner.** Faced with the dual challenge of buyer pressure and the high cost of installing environmental clean-up measures at the end of the production cycle, Nantong Yiyi focused on identifying the source of its environmental problem – a water-intensive product. As a result, it replaced its highly polluting, low profit-margin product with a more environmentally friendly and profitable product. This strategy allowed Nantong Yiyi to sell higher priced goods and establish closer purchasing relationships with its buyers.

(IPE Case File: http://www.ipe.org.cn/about/notice_de.aspx?id=4659)

CASE STUDY II: WORK WITH LOCAL GOVERNMENT TO LOWER POLLUTION CONTROL COSTS AND IMPROVE REGIONAL ENVIRONMENTAL CLEAN-UP INFRASTRUCTURE

Hanjiang Dafu Shoe Company and Putian Hanjiang Shoe Company

Hanjiang Dafu Shoe Company (Dafu Shoe) and Putian Hanjiang Shoe Company (Hanjiang Shoe) are located in Fujian Province's Putian City. The two companies employ more than 3,000 workers to produce leather and synthetic leather shoes and boots that are sold to international retailers such as Walmart.

Quick Facts: Shoe Industry

China is estimated to have 20,000 shoe manufacturers, mostly small and medium-size enterprises. The industry has experienced price competition due to oversupply as a result of export rebate reductions and increased custom duties, as well as rising costs, including increasing raw material prices and wages. Shoe manufacturers, like other manufacturing industries, are labor intensive and predominantly located in urban areas in China. These manufacturing factories are major dischargers of untreated urban sanitary wastewater, which is the leading source of pollution in Chinese waterways. Only 30 percent of all sanitary wastewater in Chinese townships is sufficiently treated before being discharged into China's waterways, despite the extensive construction of wastewater treatment plants in urban areas. At present, only 65 percent of these new wastewater treatment plants are in operation. One of the major causes of this low operation rate is the lack of pipeline networks that can collect and transport the sewage from the wastewater source to the newly built wastewater treatment facilities.

Environmental Problem

In March 2007, the Putian City Environmental Protection Bureau publicly announced that air and wastewater pollution from Dafu Shoe's and Hanjiang Shoe's factories had exceeded legally allowable levels. As a result of these violations, the two companies were listed on the China Air

Pollution Map. Walmart, by using the China Air Pollution Map to monitor the environmental performance of its suppliers, discovered Dafu's and Hanjiang's environmental noncompliance in 2008 and requested that the two companies take corrective measures. Walmart had established as its corporate policy that it would no longer purchase from suppliers who were found to have violated environmental regulations and did not take corrective actions.

Solutions Implemented

According to company documents provided to IPE as part of their public disclosure, Dafu Shoe and Hanjiang Shoe were aware of the pollution problem, which was caused by the inability of their facilities' septic tanks to pipe its treated sanitary wastewater to the standard discharge point. The two suppliers decided to address the problem by paying the municipal environmental fines levied on their operations as required by law because it was cheaper than installing the necessary clean-up equipment at their facilities. However, after interventions from Walmart, a key buyer, the two companies were pressured to address the environmental problem. Through their own investigation, the companies found that their local Fuliming Development Zone district was part of the newly built Hanjiang municipal wastewater treatment system. With this knowledge, the companies decided they should connect their wastewater discharges to this new municipal wastewater treatment as the solution to their environmental problems. Despite their intentions, the two companies were unable to link their wastewater to the treatment system as they were located 700 meters away from the nearest treatment pipeline inlet.

To resolve this issue, the companies in May 2009 formally requested in a letter to the district construction bureau that the wastewater treatment pipeline be extended to their facilities. In their letter the companies cited two key points: 1) environmental protection is central to global trade as international buyers demand that their suppliers meet certain environmental standards, and 2) local governments under the Water Pollution Prevention Act are required by law to construct and improve draining urban

sewage treatment facilitates in order to improve water quality. The letter said:

Following national efforts to strengthen water management, environmental protection has become one of the important technical barriers in international trade. We, as export oriented enterprises, are required to meet the environmental protection requirements, which includes the effective treatment of our sewage by qualified sewage treatment plants. Failing these conditions may result in the company losing their qualification to accept orders, which would be a serious blow to export oriented industries like ours ... the People's Government at all levels must bring into action protective programmes for city water sources and set up city water pollution controls for urban city waters. There should be construction and improvement of urban drainage networks and plans to build centralized urban sewage treatment facilities in order to improve the urban water environment. (A copy of the letter by Dafu Shoes and Hanjiang Shoes to the municipal government is available at http://www.ipe.org.cn/about/notice_de.aspx?id=4838.)

The local government eventually approved the companies' request and extended the wastewater treatment pipeline to the factories. In December 2009, Dafu Shoe and Hanjiang Shoe connected their wastewater discharges to the municipal treatment system and were able to treat their wastewater in compliance with local water and air quality standards. The companies were removed from the China Water Pollution Map database and as a result Walmart maintained its buyer relationship.

Environmental Benefits

- Treated the companies' wastewater discharges – 600 tons per day – to quality levels that met the regional government's environmental standards.
- Improved the region's wastewater treatment infrastructure by spearheading the construction of a more comprehensive treatment network, which allowed neighboring factories to have their sewage discharged into the municipal wastewater facilities and treated there.

Economic Benefits

- Avoided at least RMB800,000 in wastewater treatment costs that would have resulted from the construction of the company's own wastewater facilities, had it not used the municipal wastewater treatment facilities, according to independent estimates.
- Maintained a relationship with a key multinational buyer and reduced the costs of ongoing environmental penalties.

KEY LESSONS

- **Work with local government to strengthen public environmental infrastructure and lower environmental investment costs to suppliers.** Connecting to public environmental infrastructure can significantly reduce the environmental costs of a factory's operations and lead to improvements in environmental performance. While there are clear legal bases for local governments to build infrastructure, such as sewage treatment plants, local governments often do not have the necessary incentives to do so. As a result, suppliers often face the dilemma of making large investments for on-site treatment facilities or face the risks of noncompliance with their buyers. Dafu Shoe and Hanjiang Shoe's experience demonstrates that suppliers can spur local governments to build the necessary environmental infrastructure if they can link the investments to the region's economic competitiveness and job creation. This experience also highlights how suppliers can use the environmental demands of international business to improve the environmental quality of their own operations and the region.

(IPE Case File: http://www.ipe.org.cn/about/notice_de.aspx?id=4838)

CASE STUDY III: USE CRITICAL AND PROFESSIONAL FEEDBACK FROM THIRD-PARTY STAKEHOLDERS TO BREAK A “BUSINESS AS USUAL” MINDSET AND DRIVE POSITIVE CHANGE

Unilever China Hefei Factory

Based in Anhui province’s Hefei city, Unilever China Hefei Factory (Unilever Hefei) is the Unilever Corporation’s largest consumer product manufacturing facility in China. Products produced by the facility include shampoos, such as the brand Clear, which are sold throughout China.

Quick Facts: Personal Care and Household Cleaning Industry

China’s personal care and household cleaning products industry is one of the country’s fastest growing sectors. Waste discharges from this industry contain high levels of Suspended Solids (SS), Chemical Oxygen Demand (COD), biological oils, and grease. Since end products are quite different in their component surface active agents, phosphorus compounds, lipids, and coloring materials, the chemistry of the wastewater produced is complex and difficult to treat. Such environmental impacts are of growing concern to the central government. In the draft of the 12th Five Year Plan (2011 through 2015), improving the environmental performance of the personal care and household cleaning product sector is listed as one of the 12 major policy goals for industry.

Environmental Problem

In June 2007, the China Environmental News – the official newspaper of the Ministry of Environmental Protection - reported that the local environmental bureau’s on-site monitoring station had found wastewater COD levels from Unilever Hefei’s facility to be at 379 milligrams per liter (mg/l), exceeding regulatory levels. The report led to Unilever Hefei’s listing on the China Water Pollution Map, where the company attracted attention from environmental organizations who demanded an explanation for the violations. Unilever Hefei responded to the request in a

timely manner and agreed to conduct a third-party environmental audit of its facilities based on the GCA audit protocol, which requires independent verification of environmental compliance. The company hired a GCA recognized environmental consulting firm to conduct the independent inspection. The auditing process found that the facility’s on-site treatment system was not being used according to specifications and that the system’s biological treatment process was inadequate because the amount of wastewater being treated was beyond the system’s treatment capacity. As a result, the facility was unable to reduce the pollutant levels of its discharged wastewater effluent to required levels.

Solutions Implemented

The independent audit found that Unilever Hefei’s main problem was the large amount of wastewater discharged from the cleaning process of its manufacturing systems, which was the result of the factory’s use of the same production line to produce multiple products. According to the environmental audit report, “*the constant switching of products on the production line generates large volumes of wastewater during the repeated cleaning of the reaction tanks, storage tanks, and transmission pipelines.*”

Based on this analysis, Unilever Hefei’s managers made an executive decision to cut the amount of water consumed in the production process by simply reducing the number of products that were switched and manufactured each day within the production system. The action led to less hot water flushing and required almost no additional costs or major retrofits to the production system. After these measures were implemented, the local environmental protection bureau found that the effluent levels of Unilever’s treated wastewater were in compliance with the law.

Environmental Benefits

- Reduced water consumption by 25 percent from 2.77 cubic meters to 2.06 cubic meters per ton of product produced.
- Reduced the pollutant content of treated wastewater to a level that was in compliance with the law.

Economic Benefits

- Reduced wastewater treatment costs by RMB1.6 million a year because the company decreased the amount of wastewater needing to be processed by outside treatment companies.
- Reduced water resource expenditures involved in manufacturing processes.

KEY LESSONS

• **Use critical feedback from third-party stakeholders to break a “business as usual” mindset and drive positive change.** Successful companies may become complacent about improving their operations, particularly on issues related to environmental performance. By immediately responding to public concern and inviting an independent third party audit, Unilever Hefei willingly exposed itself to the scrutiny of external stakeholders. This engagement helped the company to think “out of the box” in its quest to improve environmental compliance and adopt simple and low-cost effective solutions.

(IPE Case File: http://www.ipe.org.cn/about/notice_de.aspx?id=4615)

CASE STUDY IV: ESTABLISH TRANSPARENT COMMUNICATION CHANNELS ABOUT ENVIRONMENTAL PERFORMANCE WITH LOCAL COMMUNITY STAKEHOLDERS TO ALLEVIATE TENSIONS

SRL Company

Located in Shanghai's Dachang township, SRL Company also known as Fuguo, is a foreign-owned leather manufacturing and processing company whose products are used to make international branded shoes, such as Timberland.

Quick Facts: Leather Tannery Industry

The tannery industry is one of China's most polluting light industries, producing about 235 million tons of wastewater every year. Tannery wastewater is complex, highly concentrated organic wastewater containing heavy concentrations of Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), sulfides, ammonia nitrate and suspended solids, as well as toxic heavy metals, such as cadmium and hexavalent chromium. In addition, the offensive odor and waste gas emitted from tanneries are major sources of complaints by local communities, particularly from urban residents who have higher levels of environmental awareness. As a result of negative public sentiment, some local governments have banned or limited the expansion of leather tanneries in recent years. As of September 2010, the China Water and Air Pollution Map listed some 850 violation records by tannery companies. In 2009, the Ministry of Industry and Information announced guidelines for the leather industry, which in turn indicated its intention to shut down small polluting tanning plants. In addition, the guidelines require by 2010: 1) 50 percent of the water used by leather factories to be recycled water; 2) water use efficiency and recycling rates to be increased by 10 percent compared with 2007 levels; and 3) COD discharges to decrease by 10 percent compared with 2007 levels.

Environmental Problem

Over several years, local residents had filed complaints and petitions against SRL to rectify its offensive odor emissions. In response to citizen action and based on its own monitor-

ing between 2004 and 2009, the local environmental protection bureau had listed SRL as an emission standards violator. The bureau had also ordered SRL to take corrective action to reduce the release of offensive odor. Furthermore, the local district government agency had recommended that the municipal government consider the relocation of SRL to stop its impact on local communities. As a result of government and public pressure, in 2006 SRL began to take corrective actions, such as stopping the operation of its high chromium-polluting wet-blue tanning process that was a major source of offensive odor.

Despite taking action, SRL did not communicate its corrective measures to the public. As a result, local residents and public interests groups continued to file complaints against SRL for its environmental performance. In April 2009 a local resident with help from a volunteer lawyer associated with the environmental group Friends of Nature (FON), filed a legal suit requiring that SRL disclose its environmental data. While the case was dismissed by the local court without public reason, the action spurred more action by protesters. In June 2009, 18 Chinese environmental groups wrote a letter to SRL demanding that the company make public its pollution data. The company did not respond, prompting the environmental groups to address the issue through SRL's value chain. In July 2010, FON and the Institute of Public and Environmental Affairs (IPE) contacted the CEO of SRL's major U.S. customer, Timberland, about the supplier's poor environmental performance. The groups demanded that Timberland improve the supervision of its supplier's environmental record, precipitating widespread domestic and international media coverage, which damaged SRL's reputation with the public and its customers. Timberland responded by requesting that SRL meet with the citizen groups. (For more information, please view China Economic Net, "Shanghai Fuguo pollutes for the last 6 years – environmental groups accuse," July 31, 2009 and South China Morning Post, "Timberland linked to polluting factories," August 7, 2009.)

Solutions Implemented

In July 2009, after pressure from Timberland, SRL's management released the company's environmental records on its website. The company also contacted environmental groups to establish a dialogue. In September 2009, the CEO of SRL organized an open house and invited environmental groups, local residents, members of the media, and customers to visit the company's factory. With representatives from Timberland attending, the event was the first time that SRL had openly responded to public complaints. The CEO and his team established a communication channel with a community representative and committed to responding directly to any reports of offensive odor emitted from the factory, by establishing a hotline that members of the public can use to file pollution complaints directly to the company. In addition, SRL, in an effort to foster transparency, published the daily monitoring data of its wastewater effluent on its website. To prove that its environmental data was accurate and to build trust with local community members, the company agreed in April 2010 to inspections of its facilities by independent third-parties under the supervision of local community representatives and environmental groups. Conducted by an international firm, the audit confirmed that SRL had indeed rectified some of its environmental violations. The report also identified new environmental issues that SRL needed to address. As of September 2010, the verification of the new actions taken by SRL has yet to be completed.

Environmental Benefits

- Reduced the offensive odor gas emissions that impacted the local community.
- Established an environmental management system based on communication with the local community, such as a hotline that allowed the company to respond immediately to any public complaints about the pollution.

Economic Benefits

- Reduced the risks of new public and government sanctions, such as lawsuits, fines, and forced factory relocation, that could disrupt company operations.

KEY LESSONS

- **Establish open and transparent communication channels about environmental performance with local communities and public interest groups to alleviate tensions and build trust.** As SRL's experience illustrates, ignoring complaints from local communities and environmental groups about environmental pollution, can damage a supplier's reputation and its relationships with buyers. In the face of public pressure, outreach to key stakeholders can help companies address concerns before they escalate further, while public disclosure of environmental performance can be a first step in regaining public trust. Regardless of these steps, suppliers will also need to prove the validity of their actions that will require independent verification.

CASE STUDY V: GREEN SUPPLY CHAIN MANAGEMENT REQUIRES SECOND-TIER SUPPLIERS TO IMPROVE ENVIRONMENTAL PERFORMANCE AND TRANSPARENCY

YSW Snap Fasteners

Located in Jiangsu Province's Wuxi city, YKK Snap Fasteners (YSW) is a member of the Japanese YKK Group and produces metal buttons for Chinese export-apparel companies supplying top international clothing brands.

Quick Facts: Electroplating Industry

China is estimated to have 15,000 electroplating factories with the majority of companies in the sector operating at a loss. In addition, the majority of the companies in the sector have water resource and water utilization rates that are much higher than international industry averages. Electroplating processing requires extensive use of highly acidic and alkali chemicals. As a result, wastewater and air emitted from electroplating facilities must be strictly controlled. In China, the electroplating industry annually produces 400 million tons of wastewater containing heavy metals, 50,000 tons of solid waste, and 300 billion cubic meters of acidified air. As of September 2010, the China Water and Air Pollution Map had nearly 2,000 records of violations by electroplating companies. In 2006, the Ministry of Environmental Protection established strict environmental standards for the electroplating industry containing specific requirements for manufacturing equipment, resource use, and waste treatment.

Environmental Problem

In February 2009, the Wuxi Environmental Protection Bureau (EPB) announced via its website that YSW had been cited for environmental infractions. As a result of this public disclosure, YSW was listed on the China Water Pollution Map. One of YSW's customers, the Esquel Group, which uses the map and database to screen its suppliers for environmental compliance, immediately contacted one of its clients – Nike – because YSW had been designated by Nike as a second-tier material supplier of zippers and buttons. Nike responded by requesting that

YSW provide a detailed explanation for the environmental violations. Under pressure from both its direct and end buyers, in July 2009 YSW hired a Guangzhou-based environmental consulting firm to conduct a third-party audit that included local NGOs as observers. The auditor reported that in March 2008 the Wuxi EPB had found sample wastewater from YSW's final discharge point exceeded the discharge standards for copper, Chemical Oxygen Demand (COD), and pH levels established by the "Jiangsu Province Lake Tai Water Pollution Prevention Regulation." The violations were considered very serious as Lake Tai is designated by the Chinese government as a sensitive watershed prioritized for strict pollution control.

Solutions Implemented

The third-party audit found that YSW after it was cited by the EPB had taken corrective actions in April 2008 to reduce its high copper effluent levels, which had been caused by ammonia from its laboratories mixing with copper ions, resulting in copper cementation. To solve the problem, the company hired an independent waste treatment company to collect and treat the factory wastewater, which contained high levels of ammonia, ammonium chloride, and concentrations of liquid copper. Later in June 2008, YSW installed its own copper effluent monitoring station connected to the Wuxi Environmental Protection Bureau's monitoring system. This internal monitoring system verified that the company's wastewater effluent levels had not exceeded government regulations since July 2008. The audit identified additional minor issues, which were quickly resolved by YSW. As of result of the release of its internal monitoring data and independent verification of its corrective actions, the company was removed from the China Water Pollution Map and its first- and second-tier supplier relationship with the Esquel Group and Nike was maintained.

Environmental Benefits

- Reduced environmental impacts, specifically copper, a heavy metal that is toxic to fish species, in an ecologically sensitive watershed region with a high population density.

Economic Benefits

- Maintained the supplier relationship with its direct and end buyers by proving environmental compliance.

KEY LESSONS

• **Green supply chain management requires second-tier suppliers to improve environmental performance and transparency.** In the past, the environmental performance of second-tier suppliers escaped the scrutiny of the multinational buyers and the public as their primary focus was on the compliance of first-tier suppliers. However, as the YSW case demonstrates, first-tier suppliers are increasingly required to monitor the environmental compliance of their suppliers in order to maintain their own green status. Extended supply chain management requires second-tier and other upstream suppliers to improve both their environmental compliance and transparency of their actions in order to avoid disrupting buyer relationships.

(IPE Case File: http://www.ipe.org.cn/about/notice_detail.aspx?id=4788)

IV. CONCLUSION

Chinese suppliers face a challenging future: in addition to producing low cost, high quality products, they face increasing pressures to manufacture these products in an environmentally sustainable manner for their customers. As more and more companies look to “green” their supply chains, Chinese suppliers must find ways to respond to these demands or risk being driven out of business as a result of losing key buyers. While there are significant obstacles to improving environmental performance, Chinese firms are already finding ways to turn this challenge into an opportunity to become more efficient and competitive.

The case studies highlighted in this report demonstrate how China-based suppliers, of varying size, are improving their environmental performance within the Chinese business landscape. In all of the case studies, the identification of an environmental problem was ultimately met with a practical solution. As such, Chinese suppliers prove that once they put their energies into achieving a business goal they are usually able to achieve it better, faster, and cheaper than their international competitors. It is critical that these energies are devoted to driving improvements in the environmental performance of Chinese industry so that Chinese firms can not only contribute to China’s, but the world’s sustainable economic development.

V. REFERENCES

Boston Consulting Group, “Capturing Green Advantage for Consumer Companies”, January 2009.

Carbon Disclosure Project, “Supply Chain Report 2010,” 2010.

China Business Report, “Pessimism in the Chinese Textile Industry,” April 2, 2008.

China Leather Industry Association, 2008 Report.

China Statistical Yearbook, National Bureau of Statistics of China, 2008.

National Development and Reform Commission, “Government Energy Efficient Procurement Notice,” 2010.

National Development and Reform Commission and Ministry of Environmental Protection, “Electroplating Cleaner Production Standards,” 2008.

US Environmental Protection Agency, Green Suppliers Network.

Walmart, “China Sustainability Summit Fact Sheet,” October 2010.

World Bank, “Addressing China’s Water Scarcity,” January 2009.

World Resources Institute, “Factsheet: Are You Ready for the Lacey Act,” December 2009.

World Resources Institute and A.T. Kearney, Inc., “Rattling Supply Chains: The Effect of Environmental Trends on Input Costs for the Fast-Moving Consumer Goods Industry,” November 2008.

Xinhua, “China gropes for solutions to SME financing difficulties,” January 30, 2009.

About the Report

The report was authored by Ray Cheung, a consultant to the World Resources Institute (WRI), and Ma Jun, Wang Jingjing and Ruan Qingyuan of the Institute of Public and Environmental Affairs (IPE). The report is part of the World Resources Institute’s Green Supply Chain (GSC) project, which promotes corporate supply chains that minimize impact to the environment and build value for both buyers and suppliers.

Acknowledgments

The report benefited from a thorough peer-review process. The thoughtful comments from Kirsty Jenkinson, Piet Klop, Jeff Rodgers, Ruth Nogueron of WRI, Allen Cheng of Strategic Sports, and Weijia Ye of the Institute of Environment and Development greatly improved the drafts of this publication. Any remaining errors and omissions are, of course, the responsibility of the authors.

Supporters

The production of this report is made possible through the generous support of the Walmart Foundation, GE Foundation, and the UPS Foundation.

About WRI

The World Resources Institute is an environmental think tank that goes beyond research to find practical ways to protect the earth and improve people’s lives. Our mission is to move human society to live in ways that protect Earth’s environment for current and future generations.