



Revolutionizing the Global Textile Industry

Addressing the global health threats posed by the textile industry is a daunting challenge, even with more than 30



years of environmental victories under your belt. Yet this challenge spurred NRDC's team of health experts to pioneer approaches that will help solve global industrial pollution problems associated with apparel, with a focus first in China, where most textiles are made.

NRDC and its partner, The Council of Fashion Designers of America, are spearheading a multi-phased initiative called *Clean By Design*. *Clean By Design* aims to revolutionize the way the apparel industry operates, from fiber and dye selection to fabric sourcing decisions to consumer care.

NRDC is tackling pollution threats here and abroad with a multifaceted strategy that uses first-rate science, partnership with government and industry, and policy know-how to clean up the world's textile industry.

In phase one of the initiative, completed in 2007, NRDC's review of factory performance in China identified textile dyeing mills as a major polluter.

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In phase two, in 2008-9, our experts audited five typical Chinese mills, investigating the use of water, materials, and energy to find cost-saving methods that would increase efficiency and lower the factory's footprint and compiled best practices for pollution prevention and efficiency opportunities. Phase two culminated in the identification of Ten Best Practices to reduce pollution and save money in typical textile mills. Phase three, initiated in fall 2009, reached out to the fashion industry to galvanize concern about the impacts of manufacturing and promote solutions. We established an advisory council of world-class designers and industry leaders to advise on outreach to the industry and flag broader concerns about environmental impacts of the fashion industry. Beginning in 2010, our final phase will culminate in the development of supply chain policy recommendations for multinational retailers, brands, designers and capacity building of China's government officials via workshops, educational materials, and opportunities to work collaboratively to revolutionize the industry and achieve change.



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Phase One Completed 2007: Reviewing environmental performance of Chinese factories

In 2007, NRDC undertook a review of China's GreenWatch program, a public environmental performance rating system for factories in Jiangsu—one of China's most environmentally progressive industrialized provinces.

Working with key provincial partners and the World Bank, we collected the ranking results for more than 12,000 industrial and commercial operations. We translated the data and entered it into an electronic database that could then be analyzed. Armed with this data, NRDC zeroed in on textiles, one of the two most polluting sectors in the region.

Representing nearly 25 percent of the province's most polluting facilities, textile factories are also notorious energy hogs, burning large amounts of coal to heat water and make steam for the dyeing and washing processes. And they are extremely water intensive. The worst of these factories were in substantial violation of the law, and many more were operating grossly inefficiently.

NRDC brought the list of severely polluting factories to key multinational corporations headquartered in the United States and asked them to investigate whether any factories in their supply chain were on the list of major violators.

After a series of introductory meetings, a number of apparel retailers and designers expressed great interest in working with NRDC to address these problems.

What can be done?

Designers and retailers can use their influence to tell any of their suppliers in violation of Chinese rules that they are not eligible for continued business unless they come into compliance. They can provide information on low-cost efficiency improvements to protect the environment and help the bottom line. They can make better selections of fibers and dyes to reduce environmental impact at the drawing board.

Finally, designers and retailers can join with NRDC to craft solutions on the ground, reinforcing and expanding the capacity of China's environmental infrastructure for long-term results that could extend well beyond the impact of a single factory.





Phase Two Completed 2009: Auditing Chinese textile mills to identify cost-saving and pollution-reducing measures

Building on more than two years of working with provincial governments in China on information disclosure and initial fact finding missions to over a dozen Chinese fabric mills and dye houses, NRDC's team launched a series of in-depth assessments of typical polluting textile dyeing mills. The assessments aimed to investigate the use of water, chemicals, and energy to find cost-saving methods that would also curb air and water pollution and increase efficiency of water and energy use. And the findings are fascinating.

The bad news is that the lack of attention in the typical Chinese textile factory is causing large, negative environmental impacts. But the good news is that there are considerable opportunities for low-cost and cost-saving improvements that will dramatically reduce impact.

For example, three key areas where increased efficiencies will lead to improvements are: color matching, improved steam management, and re-use of hot water.

Improvements in Color Matching:

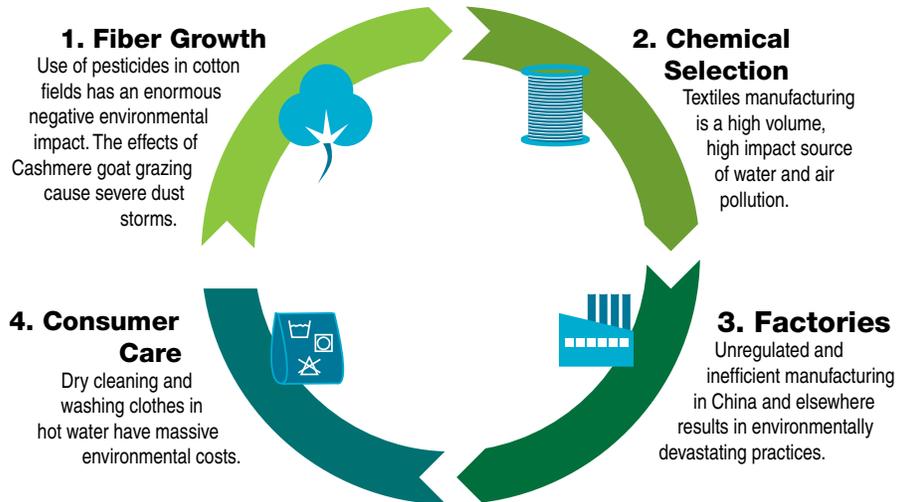
Greater attention to successful 'first-time dyeing' will yield big savings in both cost and environmental impact. Every time a fabric dye run doesn't match the color specified by the buyer, all the water, steam, dye and production time that went into the first attempt is wasted. Typically five or even ten percent of production never qualifies, no matter how many times it is run. Greater attention to housekeeping details such as accurate dye weighing and cleaner dye kitchens, as well as better control of pH, temperature, and other process parameters, will deliver great improvements.

Improvements in Steam Management:

Steam production is a major use of energy at a textile mill. NRDC's assessments revealed a general lack of insulation of the steam transport equipment as well as poor maintenance of steam traps, which allows live steam to escape, wasted. Improvements in these and other areas can lead to reductions in coal use of up to nearly 30 percent at the mill with initiatives that pay themselves back in 8 months or less.

Where are the Heaviest Impacts?

The four heaviest impact areas of the fashion/apparel industry:



Re-use of process water: Large quantities of hot water are used to manufacture textiles, up to 200 tons of water per ton of textiles in our audits. And this water is often simply flushed away, wasting both the heat and the water resource itself. Heat exchangers can be installed to re-use the energy from the hot rinse wastewater; these devices use the temperature of the out-going water to pre-heat the incoming water for the next hot rinse. In addition, hot water from condensed steam, valuable both for its high heat content and purity, can be re-used in the process, again with simple measures that pay themselves back in less than six months. Finally, clean rinse water from the final rinse can be beneficially recycled and reused at the start of the rinse process. Taken together with improved maintenance and leak fixing, these opportunities can reduce water consumption by almost 25 percent.

In 2008, Redbud Textile Technology Company in City, Jiangsu Province became the first to adopt Clean by Design recommendations. By implementing only three of the Ten Best Practices, the mill reduced its water use by 23 percent and its coal use by 11 percent at a total one-time cost of \$72,000. The investment was recouped through savings in a little over one month. Savings now accrue at over \$840,000 annually.

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Phase Three Underway 2010: Reducing environmental impact at the drawing board

Natural fibers are often associated with environmental responsibility, but this is not necessarily true: the way the fiber is grown and harvested can have an enormous and harmful impact. The same goes for natural dyes, which can rely on the harvest of millions of insects or plant bark to achieve color the “environmental” way. Fabric that requires dry cleaning or wash in hot water similarly has an enormous environmental footprint, whether comprised of natural fibers or not.

Motivated designers and brands are swamped with information on eco-fashion trends, but much of the advice is contradictory and not backed up by analysis to highlight the most important design opportunities for improvement.

In 2010, NRDC will work with designers and brands to present best practices in fiber, dye, and customer care options. An advisory group of key designers will work with us in advance to develop the agenda. NRDC will apply its policy and analytical skills to sort through all the clutter of available information and highlight the most important areas for focused improvement. Key experts will provide practical information for decision-making with the environment in mind. Participants will have the option to join forces to work collaboratively to achieve change.

Working with the industry, NRDC will develop and provide recommendations to move forward on key issues such as organic/sustainable cotton, environmentally efficient dyes, consumer tag labeling for environmental awareness, and more.



Phase Four in 2010: Promoting supply-chain best practices in textile mills

In collaboration with multi-national corporations and Chinese provincial officials, NRDC will organize workshops for textile plant managers to promote the best practices identified in our efficiency audits. And perhaps more importantly, we will work with individual designers, retailers, and brands here in the U.S. to implement these improved practices through supply chain policies that will promote improvements in their fabric sourcing mills.



With the success of early phases, under our belt, NRDC is gearing up our outreach to multinational apparel manufacturers to help hold polluters accountable. But we won't stop there. One of the most critical components to NRDC's Clean By Design initiative is not only addressing design issues in the United States, but also addressing production issues in textile factories abroad. We aim first to put sufficient leverage in the hands of Chinese officials and experts to improve environmental performance in this highly polluting sector and to transfer the knowledge and skills to Chinese managers to implement lasting solutions. Together, we believe this twin approach of working with both multinational retailers, brands and designers, and with Chinese environmental specialists, will ensure sustainable changes that truly will revolutionize the global textile supply chain.