Sustain

Issue 33 • November 2010

China's

GREEN RACE IS OFF TO A GOOD START

World Business Council for Sustainable Development

Sustain

About the World Business Council for Sustainable Development (WBCSD)

The WBCSD is a CEO-led, global coalition of some 200 companies advocating for progress on sustainable development. Its mission is to be a catalyst for innovation and sustainable growth in a world where resources are increasingly limited. The Council provides a platform for companies to share experiences and best practices on sustainable development issues and advocate for their implementation, working with governments, non-governmental and intergovernmental organizations. The membership has annual revenues of USD 7 trillion, spans more than 35 countries and represents 20 major industrial sectors. The Council also benefits from a network of 60 national and regional business councils and partner organizations, a majority of which are based in developing countries.

Sustain is published by the Communications Department of the WBCSD
Printer: ATAR Roto Presse SA, Geneva
Paper: Containing 50% recycled content and 50% from mainly certified forests (FSC and PEFC)
100% chlorine-free. ISO 14001 certified mill

ISBN: 978-3-940388-66-7

World Business Council for Sustainable Development, 4, chemin de Conches • 1231 Conches-Geneva • Switzerland
Tel: +41 (0)22 839 31 00 • Fax: +41 (0)22 839 31 31 • Web: www.wbcsd.org

Contents

Going green goes global

The global green transformation is gaining momentum, and China is poised to take the lead. The green race between countries is on. In March, at the National People's Congress annual meeting in Beijing, Premier Wen Jiabao stressed: "We urgently need to transform the pattern of economic development... We will work hard to develop low-carbon technologies." In the US, rhetoric surrounding the green race is increasing and some are asking whether or not the country might be overtaken by China as a leading supplier of green technologies.

Further figures serve to confirm the trend toward China's dominance:

- China is today the leader in new installations and production of both solar and wind power equipment. This has happened quickly. In the fourth quarter of 2009, China had a global market share in solar of 50% compared with 3% three years ago. During the same time, the US market share went from 43% to 16%.
- In wind power, China overtook the US in 2009 in new installations and manufacturing of wind turbines, nearly doubling its wind generation capacity.
- China expects that wind, solar and bioenergy will represent 8% of its electricity generation capacity in 2020, which compares with close to 4% today, in both China and the US.
- In 2009, China ranked number 1 in investment and financing for clean energy.

At 15% per year, China's fast-growing demand for domestic electricity may be the country's biggest advantage, because it will drive strong investment in new energy technology solutions. The additional capacity for electricity generation to 2030 will be nearly 9 times as much as in the US.

Top leaders in China are focused on energy policy. In January, the government created a National Energy Commission as a 'super-ministry' led by Premier Wen Jiabao himself. This Commission will spearhead efforts to supply the substantial government policy and funding support needed to make China the world's largest market for power equipment and to dominate energy equipment exports. For example, in 2009 the government committed USD 29 billion to upgrading the electricity grid.

The extent of the green race is an optimistic sign that we can, as a global society, gain speed in implementing solutions that can bend the greenhouse gas emissions growth curve, even in the absence of a binding global climate deal.

Technology, innovation and market forces are key to this, and can be powerful tools in mitigating and adapting to climate change. Any country that wants to join the green race must create national policies that will help develop a domestic market that can both build scale internally and the country's export capabilities. China is poised to take the lead on this path.

Björn Stigson
President, WBCSD

A vision for China

Between now and 2050 the global population is expected to increase from 6.9 billion to more than 9 billion, with 90% of this growth happening in the developing and emerging world such as China. The global urban population will double, while local demographic patterns will become increasingly diverse.

For Chinese business, the good news is that this growth will deliver billions of new consumers who want homes, cars and television sets. The bad news is that shrinking resources and a changing climate will limit the ability of all 9 billion to attain or maintain consumptive lifestyles.

The WBCSD's *Vision 2050* project tackled this dilemma with 29 global companies representing 14 industries. Together, they developed a vision, based on dialogues in 20 countries with several hundred companies and experts, of a world moving toward sustainability by 2050.

Forging multi-stakeholder partnerships
The input from Hong Kong, Shanghai and Beijing indicated that in order to have 9 billion people living well, and within the limits of the planet by 2050, China would have to play a crucial role.

As part of the transformation, Chinese companies would need a new agenda to work with government and society, to transform markets and competition. A key element would be to include externalities such as climate and biodiversity impacts into prices of goods and services – corporate environmental efficiency would then become a competitive advantage across industries and regions.

In the process, Chinese companies should also forge new partnerships with a variety of actors from different geographical regions, industries, sectors of society and specialties. This will be pivotal in both the development and implementation of many of the opportunities inherent in the move toward a more sustainable world.

Changes needed on five levels
China is in a position to meet a greater level of human demands. This shift can be accomplished within the ecological limits of the planet if five types of major changes are addressed:

1 Buy into the vision: accept the constraints and opportunities of a world in which 9 billion people live well, and within the limits of the planet
2 Redefine success and progress at national, corporate and individual levels
3 Get more out of the planet by increasing bioproductivity
4 Develop solutions to lower ecological impacts while maintaining quality of life in countries that have high human development, but are overusing ecological capacity
5 Improve levels of human development in countries below the threshold for high human development, without increasing their ecological impact beyond acceptable limits

Vision 2050
The *Vision 2050* study lays out a pathway leading to a global population of some 9 billion people living well, within the resource limits of the planet by 2050. Twenty-nine companies, led by Alcoa, PwC, Storebrand and Syngenta, have come together to rethink the role that business must play over the next few decades to enable society to move toward sustainability.
Download *Vision 2050*: www.wbcsd.org

能源和气候

ENERGY & CLIMATE

China's pathway to a low-carbon economy

China would benefit from transforming its pattern of economic development toward low-carbon growth pathways. Such a transformation would allow it to capitalize on new growth opportunities as a supplier that can help satisfy the increasing global demand for low-carbon technologies. There are other substantial and immediate economic benefits to be gained from improving energy and resource efficiency levels.

China has already adopted rigorous policies to realize those benefits: these are important tools for kick-starting a low-carbon economy.

Five policy areas underpin key interventions for China's transition to a low-carbon economy:

1 **Low-carbon energy** – Current energy use trends are unsustainable and will lead China to be increasingly dependent both on imports of coal and on imports of oil and gas, with higher world prices. The large share of coal in China's energy mix is one reason why greenhouse gas emissions have climbed so sharply in recent years. Driving up the efficiency of older power stations as well as carbon capture and storage are key elements to the solution, as are opportunities to switch to natural gas and upgrade the transmission grid – but a rapid increase in the share of renewable energy and nuclear power in the coming decades will be essential.

2 **Low-carbon industrialization** – China's explosive industrial development has brought many economic benefits, but has placed great pressure on the consumption of energy and other resources, which in turn drive greenhouse gas emissions and other environmental problems, not least the availability of clean water and air. The solutions range from accelerated action on energy efficiency, to reducing the share of heavy industry in China's economic structure. China aims to become less dependent on exports of heavy energy-intensive goods and a market leader in higher value-added technology, and information-based goods and services.

3 **Urbanization and transport** – China continues to experience a rapid demographic shift from rural to urban areas. The scale of infrastructure development is unprecedented and creates both risks (China needs to avoid lock-in to energy-intensive urban and industrial infrastructure) and enormous opportunities, if planning can be appropriately reformed. Energy-efficient buildings will play a key role as will low-carbon transport.

4 **Low-carbon consumption** – Individuals will play an important role in the transition to a low-carbon economy. Quality of life will improve but lifestyles will also change in important ways – from where people live to the way they travel. By means of education and via the fiscal system, an early step will be to encourage consumers to purchase lower-carbon sustainable goods.

5 **Rural land use** – Rural areas are already a priority for China in achieving balanced development, and this will only be strengthened in a low-carbon economy. Sectors such as forestry and agriculture will continue to play a key role, by taking carbon out of the air and locking it into vegetation and soils. At the same time, great potential exists for the use of biofuel in transport, biomass in electricity generation, and biogas for heating. However, second-generation technologies are needed so that the full potential can be realized, without threatening food production.

Underlying each of these are the appropriate institutions, markets and pricing reforms, technology and innovation. A solid foundation is ever-important because growing industrialization and urbanization, together with China's coal-based energy structure, put tremendous pressure on its resources and environment. China's growing dependence on oil imports raises uncertainties for economic development and also worsens energy security. With global economic imbalances causing a financial crisis, economic growth in China faces unprecedented challenges.

A low-carbon development pathway is the best way for China to create employment while achieving a resilient and prosperous society; also to build on and enhance national priorities. Efforts to maintain a safe climate are in line with the priority of developing a harmonious society and a circular economy. They are also fully consistent with existing Chinese efforts on energy saving and environmental protection. ❑

This article is based on *China's Pathway Toward a Low Carbon Economy* report by the China Council for International Cooperation on Environment and Development

www.cciced.net

Biofuels power China

Unilever

In a major step forward for its carbon dioxide-cutting program, Unilever has launched a manufacturing process at its Hefei factory in China based on second-generation biofuels. Unlike the first-generation biofuels, the second generation uses non-edible plant residues and therefore does not compete with crops for food supply.

First active in China some 80 years ago, Unilever set up its manufacturing base for home and personal care products in Hefei in 2003, making it one of the biggest manufacturing sites for Unilever globally.

The business is now using straw as a source of fuel to produce laundry powder, reducing CO_2 emissions by 15,000 tons annually (32% of total site emissions) at a considerably reduced cost to the business. The move further benefits the environment because it is no longer necessary



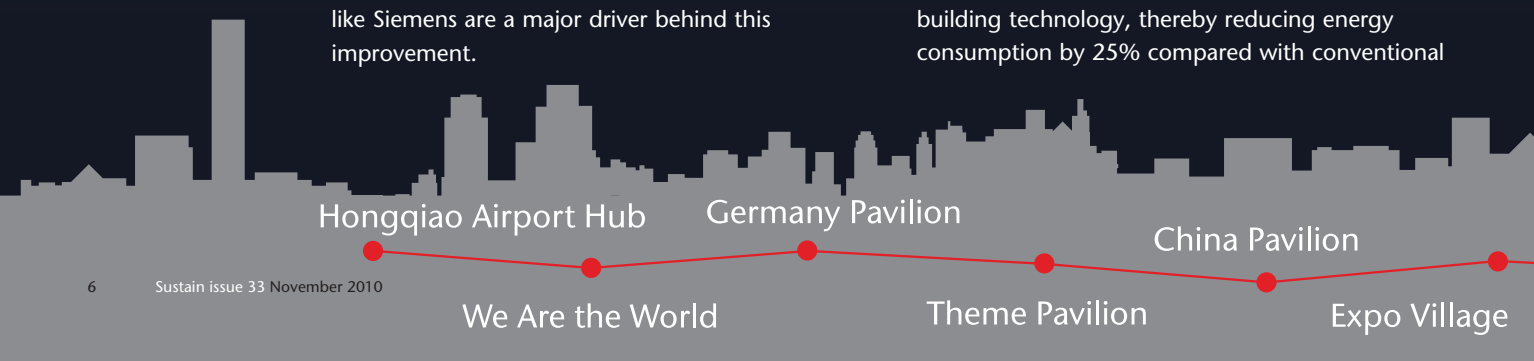


Enabling a low-carbon Expo 2010

Siemens

Large-scale events are often a catalyst for sustainable urban development, improved infrastructure and increased investment. There is no better example than Expo 2010 in Shanghai. For the first time in the Expo's history, the Shanghai edition was low-carbon, applying successful experiences in city development by using innovative 'green' technologies in areas including building, transportation, energy supply and waste treatment. Sustainable companies like Siemens are a major driver behind this improvement.

Siemens is supplying more than 1 billion Euros worth of infrastructure for both the Expo and Shanghai. More than 40 Expo projects were built using Siemens technologies that improve energy efficiency without reducing quality or comfort. For example, Siemens technologies powered the 'China Red' of the China Pavilion, not only creating a marvelous impression, but also reducing energy consumption by 50%. The Expo's five permanent constructions featured the latest in Siemens building technology, thereby reducing energy consumption by 25% compared with conventional



to burn straw to produce a source of mineral replenishment for soil, which caused severe air pollution. Fortunately, the ash produced in the Hefei plant can also be used to replenish the soil – without the damage to air quality caused by burning.

"China clearly faces serious environmental challenges, making our new biofuel-based process even more meaningful, in addition to helping our local farming community to find a new commercial outlet for their waste. A win-win for all," says David Ingram, VP, Supply Chain, Greater China Group.

China is not alone in implementing biofuels programs. In Sri Lanka, the business has unveiled a new biofuel-powered boiler that uses agricultural residues such as coconut shells and sawdust to generate steam for manufacturing processes. In India, Hindustan Unilever (HUL) has been using biofuels in its Chiplun plant, in the Ratnagiri district, since 2006. Factories in Maharashtra and Pondicherry followed suit in 2007 and 2008 respectively – using biomass as fuel to generate steam. Plants in Kenya, Tanzania, Ghana and South Africa are also now using biofuels in their manufacturing processes.

As they do not compromise food supplies, second-generation biofuels are a prime example of Unilever's commitment to renewable energies that deliver social and environmental benefits in the way they are sourced as well as in their eventual use. They will help Unilever boost its use of renewable energy, which currently stands at 17% of overall energy consumption. ❑

buildings. To ensure continuous and efficient power supply, especially during the peak summer season, Siemens installed energy-saving power distribution equipment.

In the 'We Are the World' Pavilion, Siemens partnered with the Expo Bureau to bring visitors a vision of life in a low-carbon future. Visitors experienced innovative technologies, such as a facial recognition system used for easy home access, e-cars enabled by smart grids, a virtual workshop that helps achieve work-life balance, a tailored menu proposed by an intelligent home refrigerator, and remote diagnostic technologies showing easy healthcare solutions, just to name a few. Most of the technologies displayed are in the company's R&D pipeline or are prototype applications.

About 90% of the total Expo-relevant business related to environmentally-friendly products and solutions that aim to upgrade city infrastructure while bringing down carbon emissions. A highly efficient power plant using Siemens technology covers 30% of Shanghai's energy demand, but uses more than 1 million tons less coal per year. One hundred environmentally-friendly high-speed trains that use key Siemens components will ultimately transport passengers from Beijing to Shanghai in less than five hours. The terminal of the high-speed line in Shanghai serves as part of the Hongqiao Transportation Hub, where Siemens installed China's largest parking management system.

By 2018, Siemens will supply infrastructure to more than 20 other major event host cities worldwide, including infrastructure for stable power grids, public mass transit and healthcare. Along with creating and preserving jobs, those projects will also improve visitors' experiences and the quality of life in the cities in which they take place. ❑

Hamburg House
Siemens Center Shanghai
Shanghai Metro Line
Huadong Hospital
Wai Gao Qiao Power Plants

Growing with the Chinese mainland sustainably

CLP

Many of the communities that CLP serves are in urgent need of power to support their economic and social development. Bringing affordable energy on a long-term and sustainable basis means that CLP must work with coal as it is the dominant fuel of choice in the Asia-Pacific region, but the company intends to do so responsibly. CLP also works with cleaner sources of energy such as gas, renewables and nuclear when it is practical to do so.

Founded in Hong Kong over a century ago, CLP is a leading power company in the Asia-Pacific region. CLP is committed to providing energy solutions in a financially, socially and environmentally responsible manner.

CLP's investments on the mainland epitomize its approach to powering Asia responsibly. Supporting the Chinese government's goal of reducing the carbon intensity of its economy, CLP has been actively pursuing clean energy opportunities in the mainland. From a small hydro project in the Guangdong province started in 1997, the company's portfolio today includes wind, nuclear, hydro, and biomass. Where CLP works with coal, it uses more efficient and cleaner technology. The company's goal is to maintain a balanced portfolio that allows it to produce power in an affordable manner, while meeting the promise of decarbonizing its generation portfolio 75% by 2050.

In addition to commercial investments, community investments also play a role in supporting sustainable growth on the mainland. Recognizing the importance of preparing the next generation of leaders for complex challenges, CLP has been supporting a number of education initiatives in the Mainland.

In November 2009, the company established the CLP-Tsinghua University Clean Energy Education Fund to support students with financial difficulties at the Department of Electrical Engineering at Tsinghua University and to support research programs on clean energy. Through these efforts, the Fund aims to contribute to the mainland's electricity sector by developing a pool of experts in clean energy.

At the basic-education level, CLP also runs a Young Power Program to promote environmental awareness and social responsibility through activity-based thematic learning, and has been contributing to the establishment of 11 Hope Schools with the goal of raising the literacy level and improving the learning conditions for rural children in Guizhou and Sichuan.

CLP recognizes that sustainable growth requires collective action and will continue to raise awareness about the importance of sustainability and to exchange information so that a low-carbon future becomes a reality in China. ❑

Pioneering the use of alternative fuels in China

Holcim / Huaxin

Sustainable development and social responsibility are at the core of the Chinese government's current 5-year plan, and Holcim expects that they will be even more prominently represented in next year's 5-year plan. Holcim, together with its Chinese partner Huaxin, also places great importance on these issues.

Huaxin's environmental protection business unit contributes to the circular economy by converting certain industrial and municipal wastes into fuels and raw materials for cement production. In this way, Huaxin is able to substitute part of its coal consumption and can therefore preserve precious natural resources. Holcim is involved with the Chinese government in the Asia-Pacific Partnership on Clean Development and Climate task force, and engages with international organizations to help China develop environmentally-sound and safe practices.

Efforts to this end include following strict guidelines and policies on the use of waste materials in the clinker manufacturing process. Huaxin and Holcim are playing a key role in assisting governments to develop national and international guidelines and standards for co-processing. In China, Holcim has provided a great deal of input into the 'Guidelines for Co-processing of Hazardous Wastes in Cement Kilns.' This Sino-Norwegian project is under the responsibility of the Chinese Research Academy for Environmental Sciences and aims to regulate large-scale, environmentally-sound management of hazardous waste disposal in cement kilns in order to strengthen the Chinese implementation of the Stockholm Convention and Basel Convention.

Holcim's and Huaxin's work doesn't stop there. China is the world's largest producer of pesticides, and the disposal of obsolete pesticides and their packaging constitutes a potential risk for people and the environment. Under the umbrella of the Sino-German project on 'Management of obsolete pesticides,' GTZ, Holcim and Huaxin formed a public-private partnership. Huaxin provides a waste management service through co-processing of obsolete pesticides in modern cement kilns. High temperatures and long residence times ensure the complete and safe destruction of toxic chemicals. Thanks to its vast experience in the treatment of (sometimes hazardous) waste, Holcim is able to ensure that the disposal of this waste is carried out in an environmentally-sound manner, and that relevant occupational health and safety issues are properly considered and managed. In total, Huaxin has disposed of around 1500 tons of obsolete pesticides without compromising either the safety of workers and local communities or the quality of the clinker produced.

In addition to these and other alternative fuels and raw materials activities, Holcim supports the WBCSD's Cement Sustainability Initiative in China and is a co-chair of the Initiative's China contact group. ❑





Sustainability through collaboration

Alstom Power

Environmental protection and sustainable development are high on the agenda and we see initiatives at all levels by international and national bodies, governments or businesses, to address the challenges ahead.

For many years, Alstom Power has recognized the importance of the environment in the power generation business and has positioned itself as a Clean Power provider. Alstom Power is pursuing a global sustainability strategy based on three pillars:

- Alstom Power's own footprint and the management of the ecological, social and economic impact of offices and sites we own and operate

- Alstom Power's product footprint and the management of the ecological, social and economic impact of our products from 'cradle to grave' (use of raw material, transport, erection, services and end of life of our products)

- Alstom Power is offering to contribute to our customers' efforts to produce clean power

Providing clean power solutions to China

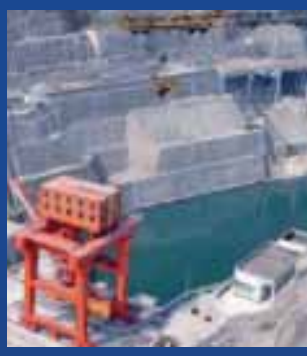
Alstom Power's global strategy is then applied locally in line with individual national requirements. For instance, in planning the country's economic and social development, the Chinese government has prioritized cutting carbon dioxide emissions per unit of GDP by between 40 and 45% by 2020 (from 2005 levels).

Alstom Power is contributing to this goal by providing clean solutions in power generation and bringing the most advanced technologies to China. In the area of Hydro, we have fully localized our engineering and manufacturing capabilities over the last 15 years and transferred our knowledge and technology to China. Around 28% of the hydro plants in China are now equipped with our technology. In Nuclear, we are working with our partner Dongfang in that direction. With regard to Coal, we are developing Wuhan Boiler Company Ltd., one of the largest and most modern manufacturing sites in the world for efficient utility boilers. We are currently implementing a cooperation agreement with Huazhong Science and Technology University (Hurst), the leading







university in China on R&D in carbon capture and storage (CCS), for one of our most promising 'new' technologies in the area of CCS. This new agreement builds upon already established agreements with HUST, to provide financial support to outstanding students and teachers.

Fighting climate change through energy efficiency

Energy efficiency in buildings is another means of reaching the Chinese government's ambitious target. Amongst Alstom Power's various industrial sites in China, Wuhan Boiler Company Ltd. stands out on a global level in terms of energy efficiency. The decision to construct a new manufacturing facility (210,000 m^2) and a five-floor office building (15,000 m^2) at Wuhan, allowing more than 1100 persons on site at any time, provided a perfect opportunity for Alstom Power to reduce its environmental footprint. Various technical initiatives were taken to reduce the environmental impact of the site:

- In the factory: low-energy lighting, presence detectors, solar-powered water heaters, etc.

- In the office building: a double-flow ventilation system, recyclable wooden insulation panels, recyclable flooring and geothermal heat exchangers that use the earth's constant subterranean temperature to warm or cool the air, etc.

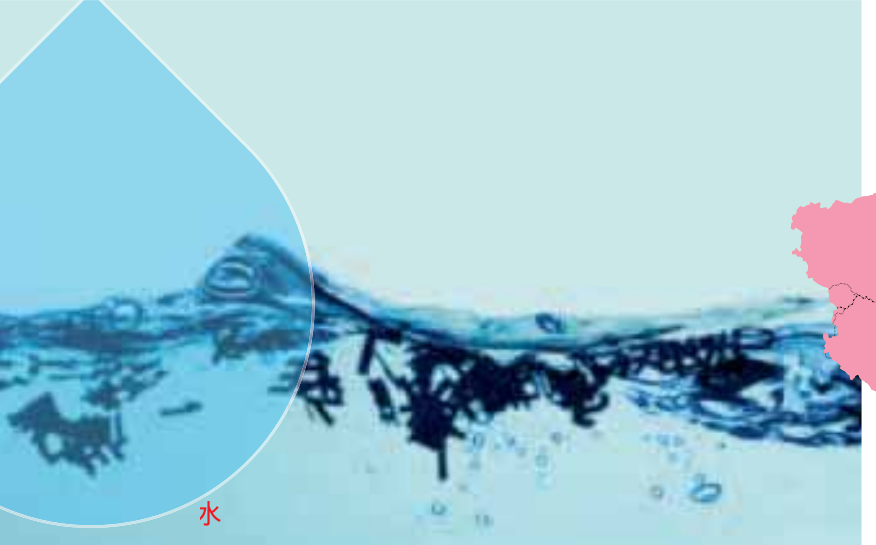
It is expected that 6000 tons of CO_2 per year will be avoided as a direct result of these innovations.

Acting as a good corporate citizen

Naturally, Alstom Power is also emphasizing its service to the local communities. In support of the Chinese government's decision to ban the distribution of free plastic bags, employees are actively involved in a project sponsored by the Alstom Foundation to raise environmental awareness by encouraging people to use eco-friendly green bags. The project has supported the manufacture of more than 43,000 durable cloth shopping bags. The Foundation also supports the Meili Mountains National Park Project to preserve the biodiversity of mountains at Yunnan Province. We also encourage our employees to launch individual initiatives.

We are proud of the achievements so far and are committed to continue supporting our customers, employees and the local communities in their sustainable development ambitions.

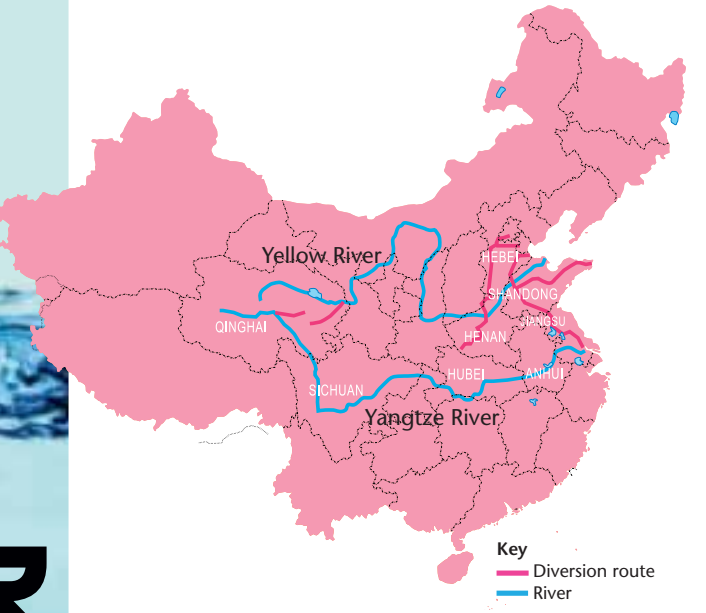


水

WATER

水



The South-North water transfer project will connect the Yangtze River to the North

China's water paradox

Mao Zedong had a well-known saying: "Water abundance in the South and scarcity in the North; if possible we can borrow a little bit of water from the South to give to the North." Today, the huge South-North water transfer project is being implemented. The project is the biggest inter-basin water transfer in the world. After a 50-year study, three water-diverting routes have been worked out: the West, middle and East routes. Water will be diverted from the upper, middle and lower reaches of the Yangtze River, with a maximum transfer volume of 38-43 billion m^3 per year. The East and middle routes have already been constructed.

The project seems to be vital, because North China is suffering from severe water shortages. However, at the same time, North China is the country's breadbasket, and annually exports substantial volumes of water-intensive products to South China. This creates a paradox: huge volumes of water are being transferred from the water-rich South to the water-poor North, while substantial volumes of food are being transferred from the food-sufficient North to the food-deficient South.

When we look at trade in agricultural products, China as a whole has a net import of water in virtual form – i.e., in the form of food commodities – of 9 billion m^3 per year, which means around 7 m^3 per person. Most virtual water is going to the

South. The North is an exporter of virtual water, both to the South and other countries. As can be seen in the figure, the virtual-water flow from North to South is around 52 billion m^3 per year.

The current North-South virtual-water transfer exceeds the planned South-North real-water transfer volume of 38-43 billion m^3 per year. One can look at this in two ways. Either, as Chinese officials tend to do, one can conclude that the planned real-water transfer from the South to the North is not over-designed, and might even be insufficient to meet the water needs in the North. Or, as some non-governmental organizations do, one can argue that reducing the production for export in the North and investing in increased production in the South would be a more straightforward solution than continuing on the path of producing in a region where water is insufficient.

Here, of course, lies the big question: is bringing huge volumes of real water from South to North worth the social and environmental consequences? From a water-resources point of view it looks odd to transfer water, in real form, from one place to another, and then bring it back in virtual form. Why not try to reduce the use of water in the water-scarce North and gradually end the production of water-intensive commodities that are traded to the water-rich South? ❑

By **Arjen Y. Hoekstra**, Professor in Water Management, University of Twente, The Netherlands

Driving sustainable development in China

ITT

ITT, a high-technology engineering and manufacturing company, operates on all seven continents, but is currently seeing its fastest and largest growth in China – where ITT's water and wastewater pump systems play an increasingly prominent role in China's expanding infrastructure development. By investing and establishing a presence in China over the past century, ITT has built credibility and a reputation for reliability among the Chinese people and government officials.

ITT has demonstrated its commitment to promoting sustainable development in China through the installation of energy- and water-efficient products and technologies in small- and large-scale projects, thus tackling China's water access and quality issues.

Frequently, ITT's customers in China are cities and project-based corporations working on major government infrastructure projects such as Three Gorges Dam, the South-North Water Diversion Project, the Suzhou Subway and the country's numerous wastewater initiatives in Beijing, Shenyang and Kunming. Most recently, ITT committed to helping China's Chongqing Water Group construct sustainable water transport networks, necessary to improve the quality and supply of freshwater in Chongqing, the largest city in Western China.

Internally, ITT's manufacturing plants in Shenyang and Nanjing incorporate 'green' practices, such as water treatment technologies that enable almost total water reuse and zero wastewater discharge – with the Nanjing plant conserving over 18,000 liters of water and wastewater each day.

To address the country's water access and quality issues, ITT collaborated with the Center for Rural Drinking Water Safety, part of China's Ministry of Water Resources, to complete two water treatment plants in China as part of a pilot project to find sustainable solutions for rural drinking water issues in China. The two plants supply more than 15,000 local residents with purified water that meets or surpasses national standards.

ITT also promotes sustainable development in China through its philanthropic efforts in the region. ITT Watermark, ITT's signature corporate citizenship program, partnered with the China Women's Development Foundation, a non-profit organization dedicated to improving the lives of women and children, to provide eight rural schools with safe drinking water, new sanitation facilities, and education on water safety and hygiene. ITT also deployed its technology to address water distress following the 2008 Sichuan earthquake, providing safe drinking water to more than 200,000 earthquake survivors. ❑

Water footprint & water-saving society development in China

A water footprint indicates both the direct and indirect water use of a consumer or producer. First introduced in 2002, this concept has evolved: it has been increasingly linked to water management decision-making and has helped companies understand water-related risks

China's per capita annual water footprint has almost tripled, from below 300 m^3 in the early 1960s to 868 m^3 in 2003. This increase is closely related to shifts in food consumption patterns, which are associated with economic growth, increasing living standards, and adjustments of agricultural policies.

Animal products generally have a much higher water footprint than vegetal products. For example, it takes about 16 m^3 of water to produce one kilogram of beef, and 1 m^3 of water to produce one kilogram of wheat. Since the 1980s, with increasing economic activity and urbanization, the consumption of animal products has gradually grown, leading to a higher water footprint. In contrast, the water footprint from vegetal products has barely changed. Due to diet shifts, the water footprint of animal products has exceeded that of vegetal products since 1997. In 2003, it accounted for 55% of the total water footprint.

The Chinese government started to promote the idea of a 'water-saving society' in 2000 to deal with the country's ever-growing water footprint and to alleviate water scarcity. In 2002, a revised water law came into effect. Article 8 of this revised law mentions that "the state shall strictly carry out water saving and devote major efforts to implementing water-saving measures, popularize new water-saving technologies and processes, and develop water-saving industries, agriculture and services, and establish a water-saving society." For the first time, the formulation of a water-saving society was written into China's water law.

In 2005, a policy document on China's water conservation technology was published to provide guidance on the development and application of water conservation technologies. It also fixes targets for this development between 2005 and 2010. For example industrial water use will have only 'micro-growth,' agricultural water use will be 'zero-growth' and water footprint intensity in cities will have to show a gradual reduction.

In 2007, China published its 11th five-year plan for the establishment of a water-saving society, including targets and tasks. According to this document, from 2005 to 2010, the blue water footprint intensity (the volume of freshwater taken from surface water and ground water to produce the goods and services consumed by the individual or community) should be reduced by 20%, and irrigation water use efficiency should be improved 45% to 50%. The blue water footprint per added value in industry should be reduced by 30% and the seepage rate in urban water supply pipelines should not exceed 15%. The recycling rate of reclaimed water should reach 20% in northern water-scarce cities and 5-10% in southern coastal cities that are short of water.

In the last decade, several pilot projects on water-saving society development have been launched. The Ministry of Water Resources set up the first pilot project in Zhangye City in the Gansu Province in March 2001. By the end of 2009, there were 82 national pilot sites and some 200 provincial pilot sites in China. Water-saving reconstruction has been carried out in 213 large-scale irrigation districts and 23 key medium-sized ones.

Water-saving irrigation has been developed in 150 demonstration projects, together with 50 pastoral pilot sites. The overall area of water-saving irrigation has reached 0.2 billion hectares throughout the country. Although 'zero water discharge' policies are not yet widely promoted, several companies (e.g., Shandong Laiwu Steel Group) have implemented these policies to increase sustainable water use.

These and other water reform efforts have attracted the investments of many foreign companies in water businesses in China. One example is Veolia Water. This French company entered the Chinese market in the 1980s and has been very active in China's water supply market since 1997. ❑

By **Junguo Liu**, Professor, Beijing Forestry University

Chinese government campaign on water conservation

城市基础建设

URBANIZATION

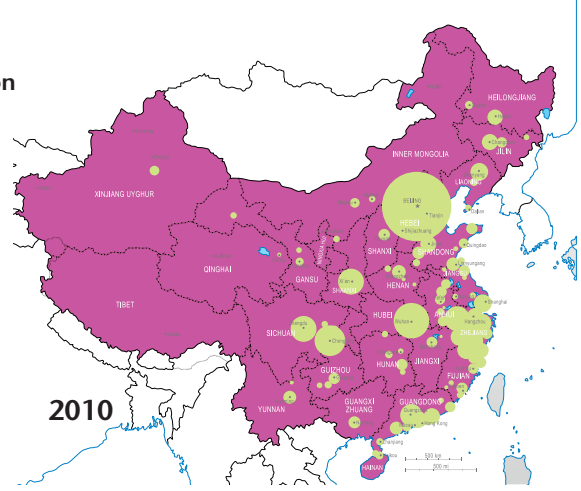
Cities in China by urban population

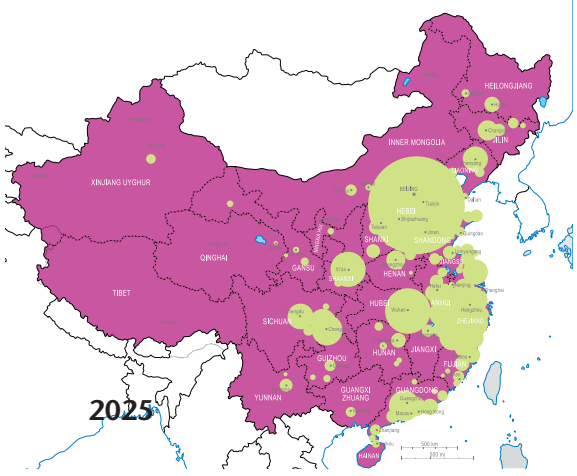
Shanghai	9,495,701
Beijing	7,296,962
Hong Kong	7,055,071
Wuhan	6,660,000
Chongqing	5,087,197
Tianjin	5,066,129
Guangzhou	4,154,808
Shenzhen	4,000,000
Guiyang	3,993,000
Shenyang	3,981,023
Nanjing	2,822,117
Fuzhou	2,710,000
Harbin	2,672,069
Xi'an	2,588,987
Chengdu	2,341,203
Nanning	2,450,000
Changchun	2,223,170
Dalian	2,118,087
Hangzhou	1,932,612
Jinan	1,917,204
Taiyuan	1,905,403
Qingdao	1,867,365
Zhengzhou	1,688,681
Shijiazhuang	1,632,271
Kunming	1,549,593
Lanzhou	1,527,383
Zibo	1,514,070
Changsha	1,489,259
Nanchang	1,386,454
Ürümqi	1,358,986
Anshan	1,287,136
Tangshan	1,279,226
Wuxi	1,245,129
Jilin City	1,244,725
Fushun	1,244,114
Datong	1,279,226
Suzhou	1,170,618
Baotou	1,146,506
Qiqihar	1,125,948
Xuzhou	1,120,534
Hefei	1,107,143
Handan	1,069,146
Luoyang	1,043,243
Shantou	940,786
Yantai	917,901
Daqing	864,148
Huainan	863,135
Benxi	831,691
Changzhou	827,131
Hohhot	817,466
Liuzhou	811,818
Ningbo	806,889
Yichun	803,724
Shangqiu	790,240
Jixi	757,647
Huai'an	725,381
Zaozhuang	711,204
Fuxin	689,928
Jinzhou	689,322
Weifang	683,971
Zhangjiakou	681,109
Mudanjiang	666,366
Pingdingshan	663,395
Xining	639,315

Source: People's Republic of China (PRC)

China's urbanization

If current trends continue, nearly one billion people will live in China's cities by 2025





Source: McKinsey Global Institute

China's sustainable urbanization challenge

China will add around 40 billion square meters of new buildings by 2020, a substantial portion of which will be multi-family residential buildings. This represents a doubling of the building stock, adding a floor area-equivalent to all of the buildings in Europe. A continuation of current construction practices – most notably lacking in adequate levels of insulation and other energy-saving materials – would magnify the energy needs of the urban residential building sector.

The WBCSD's *Energy Efficiency in Buildings – Transforming the Market* report shows how energy use in buildings can be cut by 60% by 2050 – essential to meeting global climate change targets – but this will require immediate action to transform the building sector.

In Beijing, China's capital, the challenge of transformation in a rapidly growing and sprawling metropolis of 17 million residents is especially daunting. Beijing's climate is characterized by long, cold winters and short but hot summers, thus heating is a major component of energy consumption, much of which is provided by public coal-fired district heating systems.

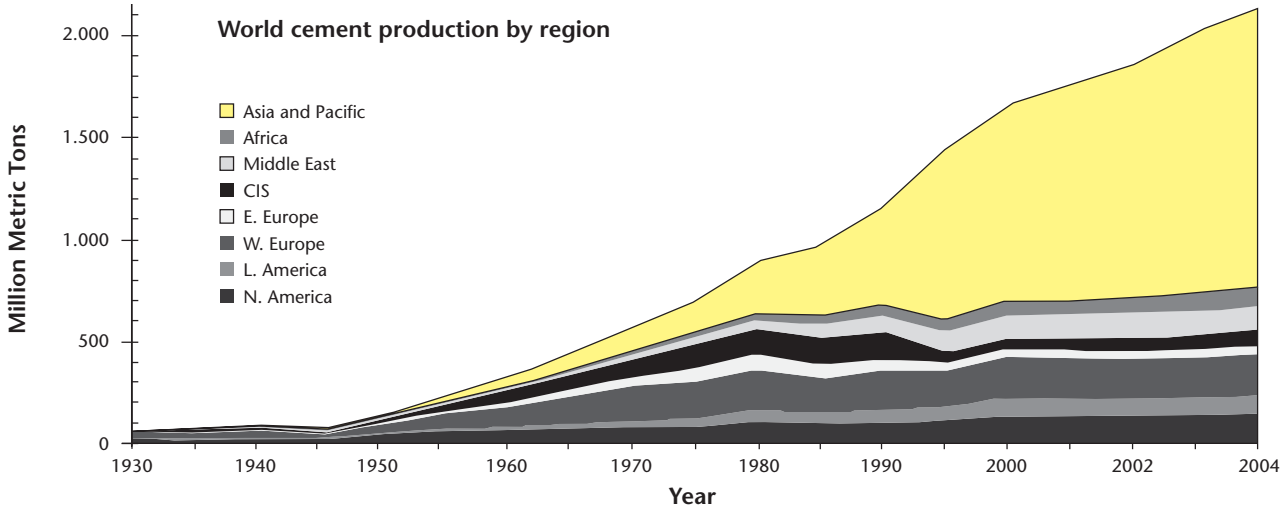
Energy efficiency in buildings modeling for Beijing apartment buildings, carried out in 2007 for the *Transforming the Market* report, shows that approximately 69% of energy consumption is devoted to space heating, 15% to water heating, 10% to plug loads (refrigerators, washers, televisions and air conditioning, among others), 4% to cooking, and 3% to lighting. The energy consumption in 2020 will be driven by both an increase in energy intensity and an increase in average dwelling size, which is expected to rise from 60 m^2 per household in 2000 to 94.5 m^2 per household in 2020.

Because heating is the dominant household energy use, any barrier to improving heating system efficiency jeopardizes the opportunity to achieve major gains in overall apartment building energy efficiency. A building's heating performance is much easier to control at the design and construction stage, so it is particularly important to secure energy savings from the start.

A comparison of selected energy efficiency in buildings models suggests that policies focused on equipment incentives, and policies that add a USD 60 carbon price are essentially equivalent to taking no action at all, generating no overall energy performance in the multifamily buildings segment.

On the other hand, a policy package that includes banning poor building envelope options and requiring heat metering, thermostatic control valves and payment for heat consumption could have significant effects on energy consumption, more so if they are taken together. With both, building owners become obligated to insulate and seal their buildings, while individual apartment owners are incentivized and have the capability to control their heat consumption. The policy package producing the greatest improvements would involve banning the construction of apartment buildings that are in the lowest tiers of performance in terms of efficiency, and providing incentives for buildings that meet the highest levels of performance.

China is on a path to significant improvement of its urban residential building stock. The opportunities to do so are both large and attainable. However, it will need stronger standards, coordinated policy implementation, widespread public support, better inspection and enforcement capacity, and market-based incentives, all working together. The challenge is to be able to respond quickly enough, and with the right resources and institutional frameworks. ❑



Cementing China's future

Cement is the glue that holds concrete together, and is therefore a key ingredient for economic development. Concrete is the second most consumed material after water.

The cement industry produces approximately 2.8 billion tons of cement per year, 50% of which is manufactured in China. Worldwide production is growing at an annual rate of nearly 4%, primarily because of rapidly increasing demand in China and other emerging economies.

Cement production is energy-intensive: it accounts for about 5% of global anthropogenic emissions of carbon dioxide, and it touches on a wide range of sustainability issues, including climate change, emissions to air and water, natural resource management and employee health and safety.

The fact that China produces half of the cement made worldwide every year points to the scale of challenges facing the cement sector in the country. It also points to the scale of opportunities available, especially as the 4-trillion Yuan Chinese stimulus plan expanded investments in Chinese railways, highways and other infrastructure, thus greatly boosting cement demand.

In 2009, China's cement production totaled 1.63 billion tons, a 16% increase over 2008. More than 170 new cement plants were built in 2009, using the latest technology. At the same time, a number of old, outmoded plants were closed down, improving the sector's energy and CO_2 profile. But even though the sector prospered throughout 2009, a series of government policies aim to reduce growth in the country's real estate industry; thus infrastructure investments are expected to decline rather than grow in 2010. To offset this decline, the government is implementing other policies aimed at shifting potential buildings to the countryside, which should mitigate the imbalance between expected cement supply and demand.

Chinese policy on climate change is also moving rapidly. In the cement sector, many small, outdated facilities have been closed, replaced by a smaller number of larger capacity units using modern technology with high energy efficiency. China has also proposed carbon intensity improvement across major energy-intensive industries, reducing CO_2 per unit of output by some 40% over the coming five years. This approach, using energy efficiency goals, is in line with the WBCSD's Cement Sustainability Initiative's (CSI) Sectoral Approach policy proposals for CO_2 mitigation.

The WBCSD continues to expand its activities in China, particularly through the Cement Sustainability Initiative. Five Chinese companies have now joined the CSI, representing about 15% of the cement-making capacity in China: CNBM, China Resources Cement Holding, Sinoma, Tianrui and Yatai. Together with the Chinese operations of existing CSI members, the CSI members now represent approximately 20% of the world's largest cement market, and 40% of worldwide production.

Today, the challenge for the cement industry worldwide, and in China in particular, is to balance the growing demand for cement with the need to forge a more sustainable cement industry. The purpose of the WBCSD's Cement Sustainability Initiative is to address these issues, and to provide practical tools for reaching a more sustainable approach to the industry's future growth. ❑

Reducing emissions
and benefitting the environment
Lafarge Shui On Cement

Lafarge Shui On Cement is actively reducing the environmental footprint of its cement production and contributing to social development in China. One of the company's first steps has been to close down 38 high-energy consumption, obsolete vertical kilns and wet kiln production lines. To do so, it invested some USD 900 million in technology upgrades and in new dry lines from 2005-2009.

Dust, NO_x and SO_2 emissions have been cut by 90%, 49% and 78% respectively per ton of clinker produced in the cement plants, and CO_2 emissions have been reduced by 29% per ton of cement produced between 1990 and 2009. Lafarge Shui On Cement is continuing to explore further low-carbon energy solutions, including projects focusing on sludge usage, soil remediation and quarry rehabilitation.

In local communities throughout China, Lafarge Shui On Cement is actively engaging its stakeholders, sharing its experiences and providing the general public with a safe, comfortable and high-quality living environment. During a June 2009 CEO roundtable for the country's leading cement companies organized by Lafarge Group and the China Cement Association, all participating cement companies signed a sustainable development declaration, the first common plan and commitment to sustainable development shared by China's top cement enterprises.

As another major achievement of this meeting, five top Chinese cement companies joined the Cement Sustainable Initiative (CSI). It has been regarded as a milestone in China's cement history as they are the first Chinese cement companies to join.

In September 2009, Lafarge Shui On Cement signed a strategic cooperation agreement with the Chongqing Municipal People's Government to accelerate the city's sustainable development. This strategic partnership covers all of Lafarge's business operations in China, from cement to ready-mixed concrete to aggregates and plasterboard. Lafarge has already operated several successful modules in the city, including a waste heat recovery project, a sludge usage project, soil remediation via sustainable cement kiln practices, and a project centered on the use of flue gas desulfurization gypsum (a waste material produced through desulfurization of flue gases in power stations and heating plants in high amounts that has a good potential for application in building structures).

These projects explore new solutions for the harmless treatment and use of local waste and have presented good results. For example, the sludge usage project in Chongqing could help the city treat over 30,000 tons of sludge per year, which not only reduces the amounts of sludge occupying land, but also precludes the need for investment in incineration, and significantly reduces coal consumption, dioxin pollution and CO_2 emissions. ❑

Sustainable steel production Baosteel

China produces nearly half a billion tons of steel annually. The resulting steel slag production, the partially vitreous by-product of smelting ore to separate the metal from the rest, amounts to some 40 million tons. Decreasing iron ore resources, coupled with increasing energy costs, have led Shanghai-based Baosteel to find ways to process the steel very efficiently while protecting the environment.

Baosteel's sustainable development efforts are focused on integrating green management into the steel-making process. This covers procurement, research and development through to production, in order to build environmentally-friendly and harmonious communities.

A key concern for the company is the reuse of industrial solid secondary resources, because producing steel is highly energy-intensive. Ten years ago, the company started developing a technology to process steel slag in its molten condition. The core technology, which cools, breaks down and separates slag from iron with multiple media in a tightly-closed vessel is highly efficient, clean, safe and resource-saving. Furthermore, many years of large-scale industrial application have proved that this technology makes it easy to conduct magnetic finished product slag separation.

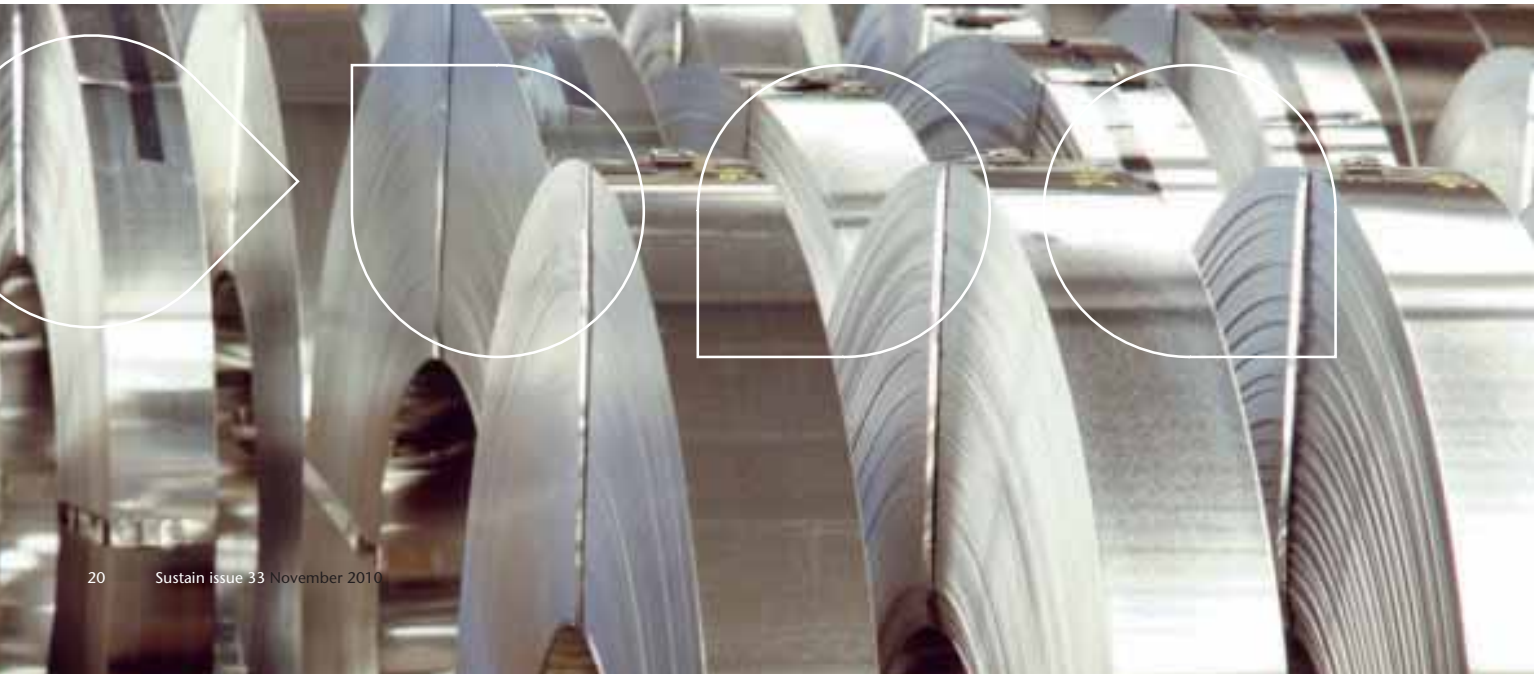
Baosteel, the largest and most modern steel complex with the widest geographical reach in China, has also launched a green procurement initiative for purchasing materials, goods and equipment. The company always uses refined materials to reduce natural resource consumption, and reduces energy consumption and slag generation in the smelting process.

The company is also developing environmentally-friendly technology, and improving the effectiveness of its green management capacities through key energy conservation and environmental protection technologies. These include: blast furnace gas dry-process dedusting, converter gas dry-process dedusting, and blast furnace coal injection, among others.

Another key activity is end-of-pipe treatment where Baosteel has developed a full package of water treatment technologies, ranging from Yangtze River water intake to water use controls in production and wastewater discharge. The company is also active in reducing air pollution, including flue gas desulfurization at its coal-fired power plants.

Established in 2007, its automatic monitoring system allows on-line automatic environmental monitoring, on-line information inquiry and reporting, etc.

Baosteel has always supported the construction and development of sites where it runs its businesses, strengthening the development of the regional economy and participating in community activities. ❑



Greenhouse gas management in China

Since the development of the GHG Protocol Initiative's accounting modules – the *GHG Protocol Corporate Standard* and the *GHG Project Protocol* – the World Resources Institute (WRI) and WBCSD have been working with partners around the world to help organizations adopt and implement the *GHG Protocol* as the foundation for GHG programs and registries.

The *GHG Protocol* offers an internationally accepted management tool to help businesses compete in the global marketplace, and governments to make informed decisions about climate change. By forming partnerships with business, government, and environmental constituents in both developed and rapidly-industrializing economies, the GHG Protocol Initiative is building the capacity to participate in a meaningful way in tackling the global climate challenge, while meeting local sustainable development needs. One prime example of this is the program in China.

Launched in 2007 in Beijing, the China Corporate Energy Conservation and GHG Management Program is led by WRI in partnership with the WBCSD and the China Business Council for Sustainable Development (CBCSD). This ambitious initiative intends to develop GHG standards and programs and pursue capacity-building in China. This will be a major step forward in China's ability to measure – and therefore manage – its greenhouse gas emissions.

New standards under development

In 2008, WRI and the WBCSD launched the GHG Protocol Product and Supply Chain Initiative to develop two new greenhouse gas standards – the *Product Life Cycle Accounting and Reporting Standard*, and the *Scope 3 (supply chain) Accounting and Reporting Standard*. Following the same independent, international, multi-stakeholder process as the *GHG Protocol*, over 1400 global experts were engaged to develop the draft standards that were released in 2009. The draft standards are currently being road-tested by over 70 companies in 19 countries and 17 industrial sectors – six of these companies are located in China. Feedback from this process will ensure that the standards generate meaningful data, while considering the practical challenges that business and programs will face in implementation. The standards are expected to be finalized by the end of 2010, and published in early 2011.

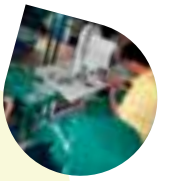
This new suite of tools and standards will enable companies to move beyond measuring greenhouse gas emissions from their own operations to their supply chains, and the products and services they purchase, produce and sell. These expanded measurement tools will make even greater emission reductions possible, by providing business with the tools and information they need to promote a low-carbon future.

In addition to China, the *GHG Protocol* has established successful partnerships to facilitate the design and implementation of GHG programs in Brazil, India, Mexico, the Philippines and North America. ❑

Further information can be found on the *GHG Protocol* website: www.ghgprotocol.org

消费

CONSUMPTION



1+3: Partnering for China

It has been three years since the China Business Council for Sustainable Development (CBCSD) launched its Corporate Social Responsibility (CSR) '1+3' project. The CBCSD has worked together with BASF and 14 other member companies and their '1+3' teams, actively exploring and promoting both a local and international approach to social responsibility in China.

The CBCSD is a coalition of 75 leading Chinese and foreign enterprises in China. Officially established in 2003, the CBCSD recognizes the importance of sustainable development and aims to nurture closer cooperation, dialogue and exchange between business, government and other like-minded organizations.

Under the CSR '1+3' initiative, member companies are expected to train three or more of their partners from their supply chain, based on their own experiences with CSR. Issues addressed include environmental protection, labor issues and human rights protection. Thirty-six companies joined the first phase of the program under the guidance of 11 multinationals, including BASF, and several Chinese multinationals, including Sinopec and COSCO.

The CBCSD is continuing the in-depth development of the project's first round and launching the second round, expanding its influence, organizing '1+3' project partner enterprises to take part in energy and climate change projects and other key activities, and further deepening the implementation of CSR practices in member companies.

The CSR '1+3' project has achieved remarkable results at home and abroad with its implementation in nearly 120 domestic enterprises, with coverage and recognition by over 100 domestic media.

"The project helps BASF to gain an additional platform for mutual exchange with its business partners, reducing risk and strengthening long-term strategic partnerships," said Dr. Zheng Daqing from BASF Greater China.

This innovative approach to integrating CSR into business operations has supported the rapid development of small- and medium-sized Chinese enterprises. To date, the CSR '1+3' project has reached 120 domestic companies, and was regarded as the best CSR practice case by the United Nations Global Compact.

The CBCSD is also active in other areas of the sustainability agenda. On energy and climate, the CBCSD's Corporate Energy Conservation and Climate Change Project aims to bring together government and business to exchange information and develop cooperation around greenhouse gas and other emissions. The China BCSD is also actively developing and disseminating various frameworks, calculation methods and guidelines around CO_2 and other emissions, as well as on health, safety and environmental issues. ❑

Driving sustainable production and consumption

Nokia China

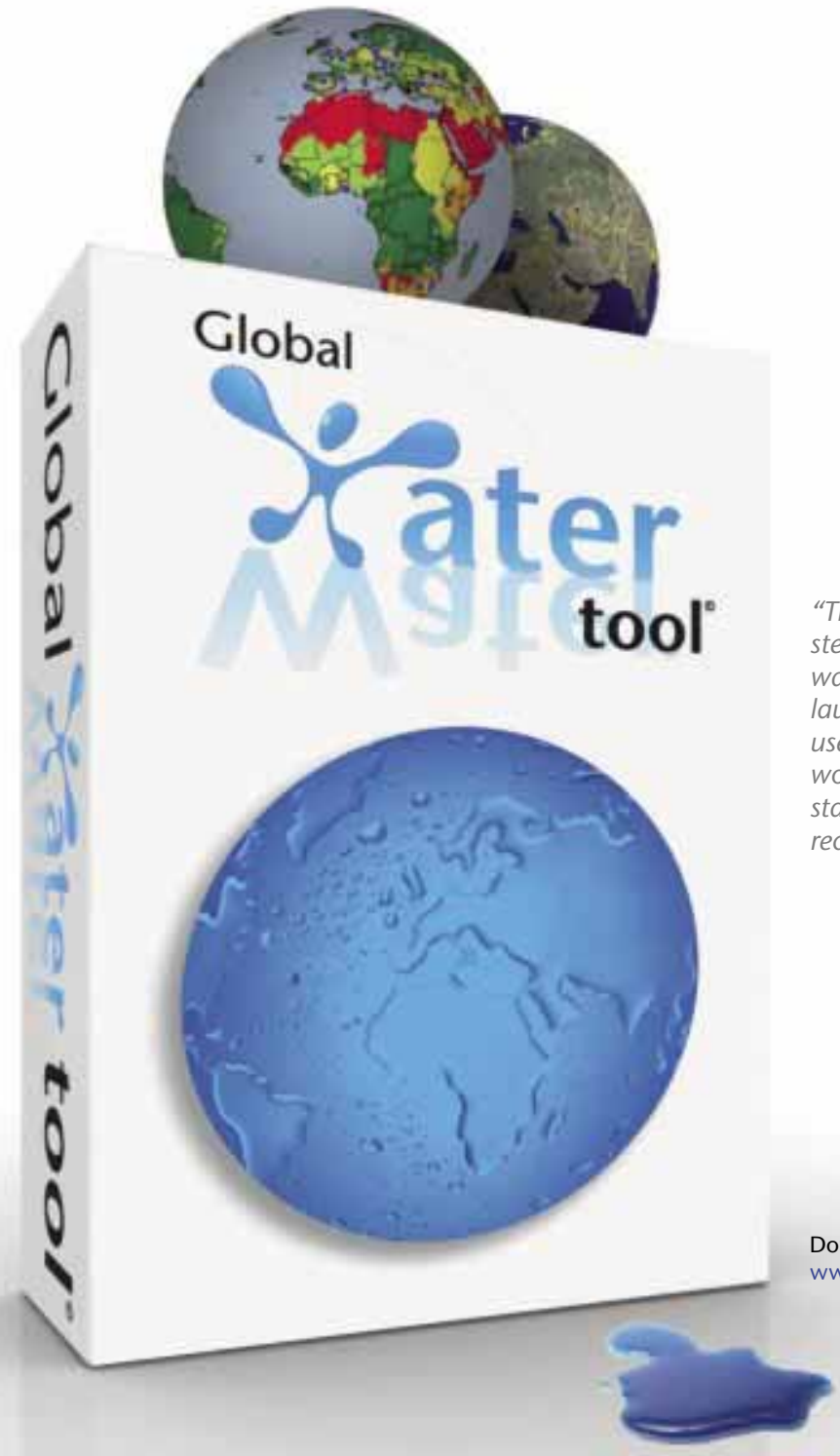
The green economy, and balancing economic and environmental development, is an increasingly important topic in China. Global companies must demonstrate leadership in incorporating sustainability issues in their own operations and product offering. China is one of Nokia's largest markets, and Nokia has had a substantial presence in the country for 25 years. Like in all Nokia's local operations, sustainability issues in Nokia China are managed according to global policies and standards, including local production and supply chain management, as well as raising consumer awareness of take-back and recycling programs.

Based on a visionary goal created a decade ago, Nokia has set up a mobile industry value chain in the Xingwang Industrial Park in Beijing that 'clusters' Nokia and its key suppliers to produce mobile phones under stringent environmental standards with regard to manufacturing, distribution, sales and recycling. Commissioned by Nokia in 2009, research at the Xingwang Industrial Park shows how well environmental protection and business goals can go hand in hand; achieving considerable cost reduction for the companies located in the area by reducing energy consumption, optimizing material use, and reducing both logistics and inventory costs. It has been called "one of the largest and most complete industry value chains in the world."

Proximity with key strategic suppliers offers a number of financial and environmental advantages, including a decrease in energy consumption equivalent to nearly 45,000 tons of standard coal, reduction of CO_2 emissions by nearly 88,000 tons, water conservation by half a million tons, as well as a reduction in packaging, equivalent to the volume of sustainable logging of more than 1500 hectares of Chinese red pine forests. The direct economic benefits of energy conservation alone are RMB 672 million (close to USD 100 million). The industrial park was developed with the support of both the Beijing Municipal Government and the Beijing Economic and Technological Development Area.

The three Rs – Reduce, Reuse, Recycle – are the cornerstone of China's environmental policy, and to meet these goals, Nokia launched the first mobile device take-back scheme in China in cooperation with China Mobile and Motorola in 2005. During the first year, 1500 recycling bins were placed in retail shops and repair centers in 40 cities, and the campaign was promoted through TV, radio, newspaper and digital channels. Incentives were used to encourage consumers to return their used devices, such as free airtime for mobile subscribers from China Mobile. Six additional manufacturers have joined the campaign, and coverage of recycling bins has been extended to smaller cities. So far Green Box has collected about 150 tons of e-waste. The campaign has received much media attention and has contributed to raising awareness of the importance of recycling in China, and the fact that everyone can make a difference with their own behavior.

As a leader in the telecommunications industry with over 1.2 billion people holding a Nokia phone, the company has a lot of responsibility – but also the power to drive sustainable choices. ❑



"The Global Water Tool is the first step for any company to make water-informed decisions. First launched in 2007, it is now being used by over 300 corporations worldwide. Non-business stakeholders, too, are increasingly recognizing its value."

Björn Stigson
President of the WBCSD

Download the *Global Water Tool*:
www.wbscd.org/web/watertool.htm

The 2010 version of the *Global Water Tool (GWT)* is now out and available for public use. It includes new and updated data and improved functionalities – making it more meaningful and easier to use.

The *Global Water Tool*, which is in use by more than 300 corporations worldwide, calculates an organization's water risk, consumption and efficiency and gives a detailed assessment of a company's current overall water management.

First launched in 2007, the tool has been upgraded for the second time as more global information has become available on assessing water risks.

This year's release includes more recent data from FAO Aquastat, WHO/UNICEF Joint Monitoring Program and the International Water Management Institute. This new data provides additional contextual information to understand an organization's use of water in relation to physical, economic and demographic environments. Furthermore it includes more projections of future water resource availability.

As businesses explore how to better manage water impacts, the *Global Water Tool* will continue to be used to ensure companies have a 360-degree awareness of their waterscape and risks and therefore make informed decisions.

现已有中文版本！

Now available in Chinese!

- Vision 2050 (2010)
- Transforming the Market: Energy efficiency in buildings (2009)
- The Corporate Ecosystems Services Review (2008)
- Sustainable Procurement of Wood and Paper-based Products: Guide and resource kit (2008)
- Powering a Sustainable Future: Policies and measures to make it happen (2008)
- Powering Sustainable Solutions: Policies and measures (2008)
- Sustainable Procurement of Wood and Paper-based Products: An introduction (2007)
- Pathways to 2050: Energy and Climate Change (2005)
- Facts and Trends to 2050: Energy and climate change (2004)
- Mobility 2030: Meeting the challenges to sustainability – Overview (2004)
- The Greenhouse Gas Protocol: A corporate accounting and reporting standard (revised edition) (2003)
- The Greenhouse Gas Protocol: A corporate accounting & reporting standard (first version – 2001) (2003)
- The Cement Sustainability Initiative: Our agenda for action Executive summary (2002)
- Toward a Sustainable Cement Industry: Battelle Executive Summary, leaflet (2002)
- Mobility 2001 – Overview (2001)
- Mobility 2001 – Executive summary (2001)
- Sustainability Through the Market: Seven keys to success (2001)
- CSR: Making good business sense (2000)
- CSR: Meeting changing expectations (1999)
- Trade, Environment and Sustainable Development (1998)