

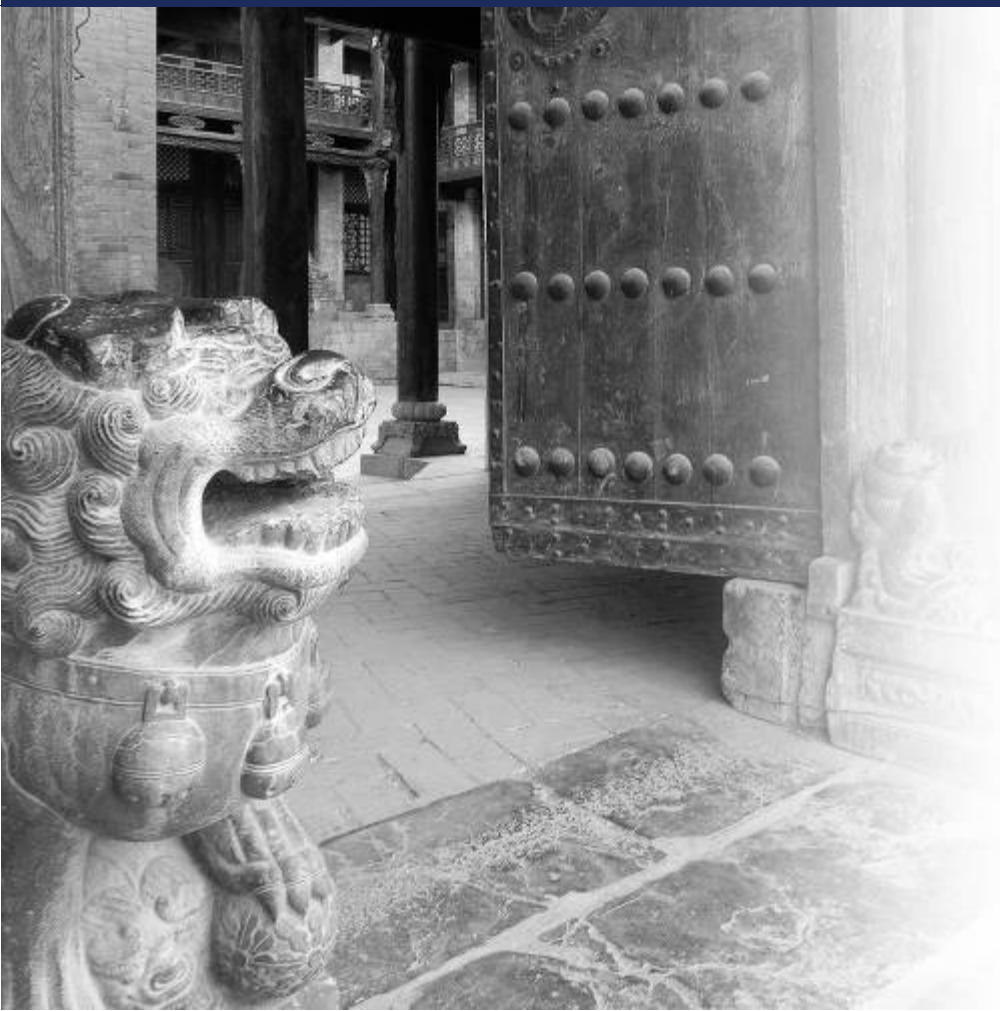
InterChina Insight



Better City, Better Life:

Building China's Eco-Buildings

By Jane Zhu & Yan Yun | April 2010



InterChina Consulting
英特华投资咨询有限公司

Beijing
Shanghai
Shenzhen
Madrid
Milan
Washington DC

Management Consultants
www.InterChinaConsulting.com

Eco-buildings are a key theme of the Shanghai World Expo. While the concept is still in its infancy in China, the country is actively developing its building sector in an eco-friendly direction, and already has demonstrated successful cases of eco-buildings. We expect the market demand for eco-building to surge in the next decade.

When seeking solutions to China's energy and environmental problems, an obvious starting point is China's towns and cities. On aggregate, buildings in China account for 40% of the country's energy consumption, one-third of water use, and just under one-fifth of greenhouse gas emissions.

Eco-buildings are environmentally sustainable and energy efficient in terms of design, construction, operation and maintenance. Such buildings use energy and water efficiently, pose no harm to residents' or workers' health, and reduce waste and pollution.

"Eco-buildings in China have just started to develop, but they have enormous potential. The Chinese government is promoting eco-buildings and is a strong supporter," Ge Caoyan, head of the Eco-Building Research Office at the Shanghai Research Institute of Building Science said.

China's Eco-Buildings

China is the world's largest construction market, and will account for over half of all new buildings constructed worldwide in the next decade. During that time, China will add at least 2 billion square meters of new building space annually, roughly equivalent to about 80,000 new 20-storey buildings.

As of the end 2009, China had only 45 eco-buildings certified under the globally accepted Leadership in Energy and Environmental Design (LEED) standard, and only 19 other eco-buildings certified under China's domestic green standard. However, the trend is clear. The number of building projects applying for LEED certification is up from just 10 in 2006 to as many as 212 as of the end of 2009.

In addition to government interest in big cities, we are starting to see developers, owners and tenants

creating a market for eco-buildings. Demand so far has come mainly from foreign companies, eager to enhance their corporate image and reduce energy and other costs.

Good examples include the manufacturing and design center of Plantronics Inc. in Suzhou, Nokia China's Headquarters in Beijing (see the box Nokia China Headquarters and its picture) and Siemens' Guangzhou Office.

Responding to growing demand from foreign tenants, some local developers have started eco-building projects. Prosper Center, a twin tower office building in Beijing, and Le Sang Estate Shopping Mall in Harbin are both LEED-certified buildings built by local developers. Prosper Center was developed by Beijing Fountainwood Real Estate Co. Ltd, while the Le Sang Mall was developed by Hadian Real Estate Co Ltd., a subsidiary of Harbin Power Equipment Co Ltd., the biggest steam engine makers in China. Both buildings are primarily occupied by multinational tenants.

According to Ms. Zhang Ying, Beijing General Manager of Jones Lang LaSalle, a global real estate services firm, multinational firms are attaching increasing importance to energy efficiency issues, and energy efficiency has become one of the major criteria for their office location selection. "80% of our multinational clients have expressed their preference for eco-buildings" said Ms. Zhang.

Expo Excitement

The Urban Best Practices Area (UBPA) at the Shanghai Expo will further raise awareness and stimulate interest in China, with the show-casing of eco-building technologies and materials from around the world. This will include replicas of real projects from 15 cities.

For example, Hamburg House, built by the city of Hamburg, has a primary energy requirement that is just 15 percent of a traditional building in Germany. The structure is insulated with special bricks and 3-layer glass curtain walls, and solar photovoltaic cells supply 80 percent of the energy needed. It is also equipped with water-free toilets.

The Hamburg House

450 square meters of solar power panels on the roof provides 80% of the electricity that the building needs.

Special bricks ensure high insulation.

The location and size of each window is carefully calculated in order to use natural light to the maximum.



Three-layer glass curtain wall ensures high insulation.

35m
Heating and cooling of the building is through the geothermal system laid in the 35-meter pile foundation.

Source: Hamburg Liaison Office Shanghai

Madrid's Pavilion: The Bamboo House and the Air Tree

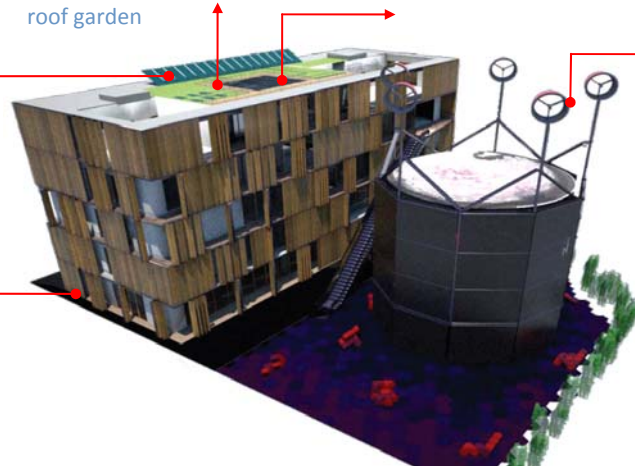
Thermal solar energy panels that operate the solar cooling system used in the pavilion. These panels will heat water in a circuit that leads it to a thermal transformer, where heat will be converted into cold.

The Intemper plant roof incorporates a series of rainwater collection tanks, as part of a low-maintenance roof garden

The central atrium of the pavilion has a semi-transparency photovoltaic glass roof, letting light in from the sky.

Mini wind turbines with capacity of 1.7 Kwh, providing part of the energy used to operate the Air Tree.

Bamboo "skin" provides heat insulation and soundproofs the flats, thereby saving on electricity.



Source: Fundación Madrid Ciudad Global 2010, InterChina interview

Technologies & Materials

A growing number of U.S., European, Japanese and Chinese companies are competing to supply their technologies and materials to eco-building projects in China. These include ARUP, designer of the Nokia China Headquarters; as well as suppliers of materials with high energy efficiency, such as BASF, which has contracts with the Expo; intelligent building technology companies such as Honeywell Building Solutions of the U.S., and Siemens Building Technology and Schneider of Germany; and air conditioner makers such as Daikin Industries of Japan and the Carrier Group of the US.

Domestic companies can match their foreign counterparts in some areas, such as lighting systems, but are still striving to close the gap in other areas.

Key Foreign and Domestic Companies with Technologies & Materials for Eco-buildings in China

Function	Product Suppliers
Insulation	Insulating Technology (Australia), Rapidwall (Australia), Owens Corning (US), Dow* (US).
Windows/Glazing	Yaohua* (China JV), Somfy Group* (France).
Lighting	General Electric (US), Philips (Germany), Panasonic (Japan), Illum-a-Lite (Sino-Australian JV), Solartube* (US), SunPipe* (UK); Eastview* (China).
HVAC	York (US), Trane (US), Daikin Industries (Japan), Carrier Group (US), Mammoth (US).
Automation	Honeywell Building Solutions (US), Siemens Building Technology (Germany), Schneider* (Germany).
Building Integrated Photovoltaic (BIPV)	ENN* (China), Suntech (China), Singyes Solar (China).

* Note: Suppliers for UBPA Build Cases of 2010 World Expo Shanghai.
 Source: InterChina interviews with experts responsible for UBPA projects and secondary research.

Technologies & Materials for Eco-Buildings with Potential Demand in China

Function	Product Suppliers
Insulation	Bubble concrete, XPS and EPS, double-paned glass, roofing, prefabricated plaster wall, low VOC paints.
Windows /Glazing	Low emission windows.
Lighting	LED lighting.
HVAC	Variable speed pumps, geothermal heat pumps, solar-thermal energy cooling systems, CO ₂ -free refrigeration systems.
Automation	Automated management systems (lighting, temperature, and appliances), motion sensors.
Water Conservation	Gray-water treatment systems.

Source: InterChina Research

Key Challenges

Low Awareness of Eco-Building Values: There is still a great deal of education needed before property developers, owners and tenants generally understand and accept the economics of eco-buildings. For a LEED Gold certified eco-building, the additional initial investment involved is 3-5% of the total building cost. With a 15-40% energy saving, the payback period on the additional initial investment is 3-5 years.

The financial community also tends not to be familiar with green building economics, generally viewing them as presenting more risks than benefits. Few financial arrangements are designed for higher upfront costs and lower lifecycle costs, so eco-building developers struggle to get bank loans on good terms.

Lack of Experience: China's lack of qualified builders and assessment professionals, including designers, architects and technical staff, presents another hurdle, says Ge of the SRIBS.

Some green materials require more sophisticated skills than for conventional materials. If workers, who tend to be unskilled migrants, are not adequately trained they will not handle the materials correctly and energy efficiency will suffer.

"Chinese workers were unfamiliar with the three-layer glass curtain wall, which they had never installed before. So we invited experts from Germany to train our workers to ensure the building was well-insulated. It's not an easy case," said Lars Anke, director of the Hamburg Liaison Office in Shanghai.

Legal Framework and Chinese Government Policy: Developers and builders must also be able to adapt advanced materials and systems to local conditions, notes Ge. Anke of Hamburg office Shanghai agrees. "To make Hamburg House accommodate Shanghai's construction standards, e.g. anti-earthquake requirements, fire control and some other specifications, we needed to work closely with Chinese designers and redesign our pavilion in some respects. It was a big challenge," Anke said.

China currently limits the scope of operations of foreign building design firms by requiring the involvement of local architecture, design and planning bureaus in design approvals. It does not permit foreign construction firms, both WFOEs and JVs, to build eco-buildings on their own. There are restrictions on the conditions under which foreign contractors can participate in projects, even if Chinese companies involved lack the necessary technical skills to carry out the work.

Nokia China Headquarters



Nokia China's HQ building has received widespread publicity as China's first newly built LEED Gold-certified commercial building (certified in 2008). It is a six-story building covering 70,000 square meters. It houses office space for 2,000 employees and a R&D center.

Some of its green features include:

- Achieves 20% energy savings and 37% water savings compared with conventional commercial buildings.
- A "breathable glass curtain wall" reduces energy use by 14%: It has two layers of glass walls with a distance of 1.2-1.5 meters in between. The space in between has a ventilation system to maintain a comfortable inside temperature in both cold and hot weather.
- 77% of the building is lit with natural light.
- All the lighting, air conditioning and projector systems are controlled by a central computer and will shut down sensors indicate no one has been using them for 15 minutes.
- A central water treatment plant recycles water for use in flushing toilets.

Conclusion

The government has set a target of reducing building energy use in all cities by 50 percent by the end of 2010 and by 65 percent by 2020, from the base year of 1980. The country also plans to retrofit over 40 billion square meters of existing residential and commercial buildings to make them more energy efficient by 2020.

As China faces growing shortages of energy and becomes more acutely aware of energy costs and constraints, such goals may well need to be exceeded. While simple and economical measures will be used, more sophisticated eco-building technologies and materials will also have a role to play.

A symbolic step will be passage of China's first ever comprehensive Energy Law, due to be enacted this year. The long-awaited legislation will encourage energy efficiency, development of clean energy and replacement of high carbon energy with low carbon energy. If enforced, it will penalize energy-intensive and highly polluting projects, disclosing their names and energy use to the public. It is to set new standards for products and equipment and impose high export taxes on energy intensive products.

More tangibly, the Chinese government is also due to set more aggressive green building targets in the 12th Five-Year Plan (2011-2015), which is now being drafted. The government's current plans focus on energy and neglect other crucial environmental issues such as water efficiency. China, with a large agricultural economy and scarce water supplies, urgently needs to dramatically improve its water efficiency. The 12th Five-Year Plan may include stringent water conservation goals for green buildings.

However, for the most sophisticated eco-building technologies and materials on offer by foreign companies, government regulations may not be sufficient to generate demand. Instead, the effort to build awareness of the economic argument needs to be strengthened, and the interests of property developers, owners and tenants better aligned.

Selected UBPA Building Cases in the 2010 World Expo Shanghai

City	Case	Featured Eco-friendly Technologies
Hamburg, Germany	Hamburg House "A sustainable building of the highest ecological standard" (Energy savings of 75% compared to traditional buildings)	<ul style="list-style-type: none"> • Power supply: solar PV supply 80% of power. • Insulation: special brick and 3-layer glass curtain wall. • Lighting: natural lighting, and window direction adjusts to follow the sun. • Heat & cooling: geothermal heat pump for generating hot and cold water for heating and cooling. • Water conservation: water-free toilet. • Integrated automation system.
London, UK	BedZed Zero-Carbon Pavilion	<ul style="list-style-type: none"> • Power: solar PV (roof and windows), bio-energy generated from restaurant leftovers. • Heating: solar heating (transparent sun house), and heat generated from restaurant leftovers. • Ventilation: wind power (wind caps on roof). • Cooling and dehumidification of air: solar energy and river water. • Lighting: special coating interior wall to store solar power during daytime and convert to light in the night. • Water conservation: rain water collection system for watering plants and flushing toilets.
Madrid, Spain	Bamboo House and the Air Tree	<ul style="list-style-type: none"> • Power: solar PV panels (roof), wind power. • Heating: 'solar wall' to maintain consistent interior temperature. • Lighting: energy saving glass, system to use natural light to the maximum.
Shanghai, China	Shanghai-EcoHousing	<ul style="list-style-type: none"> • Power: solar PV, wind power. • Insulation: thermal insulation coatings, hollow bricks made of silt of Yangtze River, gypsum boards, 3-layer glass at sky light. • Heating & cooling: shallow-layer geothermal energy application technology. • Ventilation: natural ventilation. • Lighting: natural lighting (atrium lighting system), LED lighting facilities. • Water: reclaimed water system, which collects rainwater and grey water for toilet flushing. • Building automation system. • Locally sourced materials.
Calgary, Canada	Water Center	<ul style="list-style-type: none"> • Window: adjustable windows with functions of monitoring and maintaining air quality. • Ventilation: natural ventilations system under the floor. • Water: rain water collection system for watering plants and flushing toilets.
Milan, Italy	Green and Blue Milan: The new "Il Sole 24 Ore" headquarters: an example of sustainability	<ul style="list-style-type: none"> • Insulation: highly transparent and shake-proof filtration membrane double-deck glass, window blinds.
RHÔNES-ALP ES, France	Bioenergy & Sustainable Housing in an Urban Environment	<ul style="list-style-type: none"> • Insulation: heat preservation brick, 2-layer insulating glass, computer controlled solar energy wall that can be automatically opened and closed. • Ventilation: natural ventilation. • Lighting: energy saving lighting, react to sunlight variations.

Source: InterChina Research



Co-Contributed by
Ms. Jane Zhu,
InfoCenter Head,
InterChina Consulting

Zhu.Jin@InterChinaConsulting.com

Jane Zhu, a Chinese National, is a Consultant in the Strategy Practice of InterChina Consulting, based in Beijing. She runs InterChina's InfoCenter, a team of research specialists which supports client projects.



Co-contributed by
Ms. Yan Yun,
Associate Consultant,
InterChina Consulting

Yan.Yun@InterChinaConsulting.com

Yan Yun, a Chinese National, is an Associate Consultant in the Strategy Practice of InterChina Consulting, based in Shanghai.

Edited by Kazuhiko Shimizu, Shanghai-based writer and editor.

InterChina Consulting

Leading Consultancy: InterChina is a boutique management consultancy specialized in strategy, corporate and human resources services for companies doing business in China. Since being founded in 1994, InterChina has emerged as one of the leading consultancies in China, and half our project volume is accounted for by clients choosing to return to InterChina when new consultancy needs arise.

Comprehensive Services: InterChina supports clients along the sequence of challenges faced when entering or expanding in China, and our 3 specialized consulting practices combine to provide a suite of comprehensive and complementary services:

- InterChina's Strategy Practice assists our clients better understand and penetrate their markets in China.
- InterChina's Corporate Practice supports our clients establish and expand corporate structures in China.
- And InterChina's Human Resources Practice helps our clients recruit executives and other key positions in China.

Differentiated Approach: We deploy consulting methodologies developed in China for China. Our strategy solutions are practical, since we often support clients implement the strategies we recommend, and our corporate solutions are always oriented towards strategic objectives. We involve our clients in the consulting process, transferring understanding and receiving feedback, enabling our clients to better adapt to the Chinese environment and ensuring continuity following the project.

Strong Sector Expertise: As our clients are international companies with demanding consultancy needs, InterChina has developed expertise in select sectors to further our delivery of pioneering and practical solutions. These sectors include (but are not limited to): Automotive, Energy & Power, Machinery, Chemicals, Healthcare, Food & Beverage, and Distribution & Retail.

Stable Consulting Team: InterChina's Board of Partners is both Western and Chinese, and our Partners provide stability through their commitment to the company. In fact, InterChina enjoys one of the highest employee retention rates in China, and as stability is fundamental for Consulting Teams to be successful, our clients benefit directly as a result. Moreover, all our 50 plus consultants are committed and capable professionals, with a balance of experience and skills that allow InterChina to customize Project Teams to meet the needs of individual clients.

Local Presence: InterChina has three operations offices in China, located in Beijing, Shanghai and Shenzhen, supported by liaison offices in Europe, located in Madrid and Milan, and North America, located in Washington D.C.

For further information, please visit our website at www.InterChinaConsulting.com