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NAVIGATING CHINA'S LOGISTICS LANDSCAPE

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SPECIAL REPORT: Energy and Environment

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Visitors view a model of the Sino-Singapore Tianjin Eco-City, which is expected to become home to roughly 350,000 people once it is completed in 2020.

China's Green Building Future

Green building makes up a small proportion of China's construction industry, but government targets may give sustainable building a boost over the next five years.

Christina Nelson

About 60 kilometers outside Hangzhou, the capital of Zhejiang province, is a luxury resort surrounded by the bamboo forest and tea plantations of Moganshan. The owners of Naked Stables Private Reserve—named for its stripped down, natural environment—aimed to make as minimal of an impact on the surrounding environment as possible by reducing water and energy use and growing their own food on site. “[The owners] did all these things because they thought it was the right thing to do,” says Alessandro Bisagni, founder and managing

director of BEE, Inc., a sustainable building consulting firm that works on projects in China and the United States.

Since the first building in China was awarded a gold rating by the internationally recognized Leadership in Energy and Environmental Design (LEED) rating system in 2005, green building's popularity has grown in China. Green building still makes up a small proportion of building in the world's largest construction market, where maximizing profits and lowering building costs often trump sustainable design and energy effi-

ciency considerations. Multinational companies, large Chinese companies, and an increasing number of hotels and resorts are currently the most likely green builders in China, but increasing environmental awareness and central government policies that set ambitious targets to reduce China's overall energy use may make green building practices more widespread in the coming years.

Green building on the rise

In 2011, developers in China started constructing 1.9 billion square meters of floor space and invested ¥6.2 trillion (\$983 billion) in property development, according to the PRC National Bureau of Statistics. At the same time, China's 12th Five-Year Plan (FYP, 2011-15) aims to reduce overall energy use by 16 percent per unit of gross domestic product (GDP) and reduce carbon dioxide emissions by 17 percent per unit of GDP by 2015. Because buildings account for roughly 25 percent of all energy consumed in China, regulators have focused on implementing green and energy efficient practices in both new and established buildings. Beijing alone plans to build 35 million square meters of green buildings by 2015, according to the *People's Daily*.

In general, green building incorporates design, construction, and operations practices that use sustainable materials in construction, achieve energy efficiency and water savings, and improve indoor air quality, among other measurable targets. Green building developers also consider a building or project's location, selecting sites with exposure to sunlight and sites that are close to public transportation, grocery stores, and other amenities.

Evaluating all buildings and development projects in China that take these strategies into account is difficult, but develop-

ers are increasingly applying for green building labels, such as LEED certification and China's own green building certification, the Green Building Design Label, also known as "Three Star." (The system assigns buildings one to three stars, with three stars being the highest rating.) In 2005, a PRC Ministry of Science and Technology office building in Beijing was awarded a LEED gold rating, the first building in China to receive LEED certification. The Beijing Olympic Village and other facilities for the 2008 Olympics followed, and by the end of 2011, more than 800 construction projects had been registered for certification while nearly 200 had been LEED certified (see p.34). The Three Star system is newer and has fewer projects, but it has seen similar growth, increasing from 10 projects certified in 2008 to 83 in 2010 (see p.35).

Challenges

Regardless of the certification system used, the green building concept does not always translate to the China market. According to a 2011 report by the China Greentech Initiative—a collaboration between more than 100 organizations that focuses on identifying and developing green tech solutions in China—lack of understanding of green building and misaligned incentives have slowed the adoption of green building in China. Experts say construction decisions are often made based on short-term costs, such as material and labor costs, instead of considering the long-term savings from energy efficiency or green building techniques.

Bisagni says working on green building projects in the United States and China is like night and day because Chinese builders still prefer to cut costs in the short term. "The extent of solutions that you can propose in a project [in China] is limited in a way because of that payback and

LEED and Three Star

In 2006, one year after the Agenda 21 office building in Beijing became the first building in China to receive a gold Leadership in Energy and Environmental Design (LEED) rating, the PRC Ministry of Construction released evaluation standards for green buildings. The standards included China's Green Building Design Label, or "Three Star" system, for rating building sustainability. LEED and Three Star share common elements and a common goal—to reduce a building's environmental impact—but the two systems diverge in their ratings and review processes.

Three Star

China's Three Star system rates residential and commercial buildings, including apart-

ments, hotels, and office and commercial space, from one to three stars with three stars indicating the highest performance level. Like LEED, the rating uses a point system to evaluate a building's water and energy efficiency, materials and resources use, indoor environment, operation and maintenance, and site efficiency and outdoor environment. A building must obtain a certain number of points in every category to qualify for a star rating. A building is evaluated by a local, provincial, or national committee, depending on the location of the building and what star-level a developer hopes to obtain.

LEED

LEED, developed by the US Green Building Council in 2000, uses a point sys-

tem to evaluate buildings in terms of site selection, water efficiency, energy, materials and resources, indoor environmental quality, and design innovation. Unlike Three Star, LEED does not require builders to meet minimum requirements in every category, but instead allows builders to achieve a LEED rating by meeting a minimum number of points overall. LEED uses different rating systems for new construction, existing buildings, schools, and neighborhood development projects, among others. The Green Building Certification Institute administers the certifications and performs third-party technical reviews of projects that wish to obtain a LEED rating.

—Christina Nelson

LEED-CERTIFIED AND REGISTERED BUILDINGS IN CHINA, 2005–11

	2005	2006	2007	2008	2009	2010	2011	Total
Certified	2	4	0	8	31	65	85	195
Registered	8	7	47	95	152	209	279	797

US GREEN BUILDING COUNCIL

cost mentality,” he says. “In China, there’s still a large knowledge gap. In order to cross that it takes a lot of effort.”

Green building experts say that it is a myth that sustainable buildings are expensive to build. “A green building can pay for itself,” says Yingchu Qian, head of sustainability business in Asia for Faithful+Gould, a construction consulting firm. Qian, who has worked on roughly 120 green building projects in China, says that the savings from energy efficient practices and the premium developers can charge for green buildings helps investors make back any additional money spent on construction. He said it usually takes five to 10 years for a developer to make back the initial investment in a green building, but that in some cases it can take as little as two years.

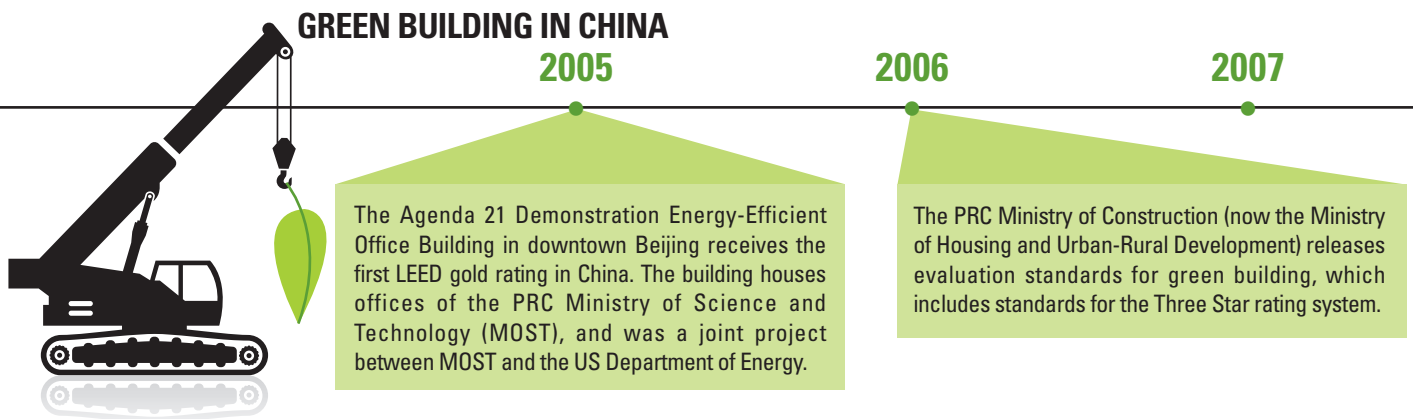
Companies that chose to build green in China early on were not necessarily focused on cost. The early adopters in China have tended to be large, multinational corporations with a “sustainability vision” and those that see green building as a good marketing tool, says Jennivine Kwan, vice president of international operations at the US Green Building Council (USGBC), the organization that developed the LEED rating system. But now more companies are considering operation costs, return on investment, higher tenant occupancy rates, and a premium on rents. “Those things are real tangible financial reasons as to why people are building green buildings from an owner-developer point of view,” she says.

Because developers in China may not see immediate cost savings, they often overlook the green features—such as better insulation and sealed windows—that could help the govern-

ment meet its energy targets. This is especially true in the multi-family residential buildings that most people in urban China live in, say researchers at the US Department of Energy’s Lawrence Berkeley National Laboratory (LBNL). “I think it also gets complicated because the tenants that live in the building didn’t build it. The builder doesn’t operate the building, so they are not motivated to invest in better insulation,” says Nan Zhou, a scientist at LBNL’s China Energy Group.

LBNL researchers have been working with the PRC government to improve energy efficiency initiatives and labeling standards, including the PRC Ministry of Housing and Urban-Rural Development’s building energy efficiency label. This rating system ranks buildings from one to five stars. A building that receives a five-star rating is the most energy efficient—requiring an 85 percent reduction in energy use compared to buildings constructed in the 1980s. (Current building codes require that new buildings achieve a 50 percent reduction in energy use compared to the 1980s.) The energy efficiency label is still voluntary for most residential and non-residential buildings, but the government requires that certain buildings receive a star rating, including new government-owned and large public buildings, existing government-owned office buildings, and large public buildings that apply for government energy retrofit subsidies.

Zhou says that because the green building and energy efficiency labels are still voluntary for the majority of buildings, such programs are not likely to reduce energy consumption in China on a large scale. “If there’s a mandatory program ...then that can definitely reduce energy use,” Zhou says.



US-GREEN BUILDING COUNCIL, PRC MINISTRY OF HOUSING AND URBAN-RURAL DEVELOPMENT, GENSLEER, CHANNEL NEWS ASIA, PEOPLE’S DAILY.

Eco-cities

While the PRC government implements energy labeling programs, provides subsidies for energy efficient technologies, and releases policies to support carbon and energy reduction goals, China's push to develop more sustainable communities, or "eco-cities," may also influence green building's future in the country.

According to the Asian Development Bank, the PRC government began encouraging development of sustainable communities as early as the mid-1990s. Dozens of eco-cities are currently being developed, according to some estimates, but arguably the most high profile is the Sino-Singapore Tianjin Eco-City. The project is a collaboration between the governments of Singapore and Tianjin and promotes water and energy conservation, mixed-use development, and comprehensive public transport for the city's expected 350,000 residents. The city's first residents began moving into apartments in mid-February, and the entire project is expected to be complete by 2020.

The PRC government's eco-cities initiative may be one reason China has the largest number of LEED for neighborhood development projects outside the United States, says USGBC's Kwan. These projects help local governments and developers design "communities that are a little more human scale, that are linked better to the outside environment, and that provide that type of safe and healthy environment for all the people who live there," says Kwan. Like LEED for buildings, the LEED for neighborhood development rating system evaluates an entire community. The rating system looks at whether the community has walkable streets and reduces residents' dependence on cars, and whether buildings and infrastructure are energy efficient, use renewable energy sources, and reduce water use.

Compared to the United States or other developed countries, mixed-use development is already common in China, where many neighborhoods feature all the services most people need within walking distance. The government's role in urban planning also makes it easier to create sustainable com-

THREE STAR CERTIFIED BUILDINGS IN CHINA, 2008-10

2008
10

2009
20

2010
83

Note: Includes buildings certified at one-, two-, and three-star levels.

ECO-CITY AND GREEN BUILDINGS, 2011

munities, Kwan says. "China is one of the few places in the world that actually decides where a city is going to happen. They actually build the city."

Green building's future in China

An analysis by LBNL researchers shows that China made the largest energy efficiency improvements in new construction and hit targets in energy management in government and large-scale public buildings during the 11th FYP (2006-10) period. However, China has not been as successful during the first year of the 12th FYP, says LBNL's Zhou, and she expects the PRC government to continue including energy and carbon reduction goals in future five-year plans. "This period will be very challenging because the first year has already ended and they did not meet the first year milestone," she says.

Whether green building will play a large role in meeting these goals remains to be seen, but advocates remain optimistic that the green building market will continue to grow in China. Still, some think the PRC government will have to implement stronger policies before mainstream developers build green projects on a larger scale. "The only way that can happen is from the top down," says Bisagni. "The government has to give direction about what green building has to be." 完

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2008

2009

2010

2011

2012

The Olympic Village in Beijing earns a LEED gold certification, the first neighborhood development project outside the United States to achieve a LEED certification. The village was home to 17,000 athletes during the 2008 Summer Olympics.

Construction begins on the Shanghai Tower, a 632-meter-high building in Pudong. According to M. Arthur Gensler and Associates, Inc., the US architecture firm that designed the tower, the top of the building will feature wind turbines that will power the building's exterior lighting and some park areas.

The first residents begin to move into the Sino-Singapore Eco-City in Tianjin. Project developers expect the city to become home to 350,000 residents by the time it is completed in 2020.

