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The future of green building in China

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China's green building demand is mainly driven by multinational companies - to achieve the country's energy saving targets local companies need to commit to green building standards too

Nearly half of the world's new building construction will be in China by 2015, estimates the World Bank. A forecast by **McKinsey Global Institute** last year said that China will build a massive 40 billion square feet floor area over the next 20 years adding up to 50,000 new skyscrapers. Energy consumption by buildings in China grew from 10% of the national total in 1970s to 20% in 2006 and is estimated to shoot up to 35% by 2020, according to a study by the **Asia Business Council**, an association of chief executives of companies with business interests in Asia.

The booming construction industry in China has also put unprecedented pressure on water resources. It is estimated that the sector accounts for 16% of total water consumption.

Improving energy efficiency of buildings is crucial for China to realise its national energy strategy. Recognising the importance of 'green buildings,' the government has set ambitious energy targets for the building sector. The key target is to cut building energy use in all cities by 50% by 2010 and 65% by 2020, using the average energy efficiency of Chinese buildings in 1980 as the base point. Beijing, Shanghai, Tianjin and Chongqing- four largest cities in China- have targets to cut building energy use by 65% by 2010.

China's 11th Five Year Plan for 2006-2010 aims to reduce energy consumption per unit of GDP by 20% and considers improving energy efficiency of buildings critical to achieving the target. The government plans to achieve the goal by strictly enforcing energy saving standards on new construction and by retrofitting existing public buildings.

Building design

In 2005, the government introduced mandatory design standards aimed at energy conservation in public buildings including adopting energy saving technologies for cooling, heating, ventilating and lighting. In 2006, a new voluntary rating system was introduced which also included other sustainability aspects such as site planning, land use, water conservation and internal air quality.

The ministry of construction estimated in 2007 that only 5% of existing large public buildings had adopted energy efficiency measures. The ministry estimates the total cost of retrofitting existing buildings, to be completed by 2020, with energy saving systems will be $193 billion. But the benefits are huge. Greening of existing buildings alone could reduce coal use by 135 million tonnes a year.

A statement by the ministry of construction in Feb last year said that the country was on track to meet building energy use targets. It said that inspections in 2007 found 97% of all new urban projects complying with energy saving standards at the design stage while 71% of those at the construction stage were in compliance. The ministry says that the work on replacing heating systems in 150 million square meters of residential buildings in

North China has started where the government is providing subsidy for retrofitting. In another initiative, 212 demonstration projects were launched in 2007, against the target of 200, for large scale application of renewable energy in construction, according to the ministry.

In an important gesture, the state council issued a directive in October last year, signed by the prime minister Wen Jiabao, asking all government-funded organizations to supervise and audit energy use and file annual reports.

However, given China's poor record of enforcement and practical difficulties in monitoring such projects in provinces, it remains to be seen whether the government will be able to achieve its targets. Provincial governments are known for competing with each other to build extravagant and wasteful buildings. Progress is also difficult to monitor. Despite the green improvements, most green building projects initiated by the government have not been certified by international standards for energy use, water conservation, design and material.

At this time successful examples of green public buildings are rare. Two exceptions are the Beijing Olympics Village and the Ministry of Science's ACCORD21 Demonstration building which boast LEED (Leadership in Energy and Environmental Design) certification awarded by the **US Green Building Council (USGBC)**.

Multinational companies leading the way

While the government seems to be driving energy efficiency initiatives in public buildings, local developers and companies are lagging behind. However, multinational companies have taken the lead to promote green buildings in China by pursuing more stringent LEED certification.

The trend was started by Plantronics, a California-based electronics company, when it obtained LEED gold certification for its new manufacturing and design centre in Suzhou. Then Nokia received its first LEED gold certification globally for the Nokia China Campus in Beijing. Other big names include Siemens and BHP Billiton. In fact, multinational companies, driven by their global corporate responsibility policies, have built eight of the total 15 LEED certified buildings in China so far. The US-based developer Tishman Speyer is constructing three projects in China aiming LEED certification to meet growing demand from multinational companies.

Other multinational companies which have registered with the USGBC to construct their own LEED-rated buildings in China include Boeing, Carrefour, Coca Cola, Carrier, Otis, Rockwell Automation, Siemens, Caterpillar, CB Richard Ellis, DOW, ExxonMobil, GE, GM, and Johnson Controls.

"At this point, the Chinese companies don't feel the same sort of pressure to demonstrate corporate social responsibility that the multinational companies feel," says Geoffrey Lewis, a Fulbright Fellow at Tsinghua University's Department of Building Sciences who closely monitors China's green building progress. Speaking with ClimateChangeCorp.com, Lewis points to one of China's top companies Petro China, which recently built an energy efficient building in Beijing for its headquarters but did not bother to get it certified.

"If a multinational company builds an energy efficient building, it will also get it certified as a green building."

Lewis says that for the Chinese companies and developers, the economics of green building have to match up as corporate social responsibility is less of a driver. "And at present, the perceived economics of green building are not necessarily there. That is why green buildings are not as widespread in China as they should be."

Green building sea change

Yingchu Qian, the East China general manager of Environmental Market Solutions Inc, a US-based green building consulting firm which has several high profile projects in China, agrees that the local companies are not focusing so much on environmental sustainability. But he says this could soon change as the government is pushing for higher standards and awareness about the green building concept is increasing in China.

Over 200 demonstration projects being built- some of them are already complete- were intended to showcase how green technologies and products improve building's energy efficiency. But sceptical developers want to see if the demo-techniques and products also work in large scale commercial projects.

Local developers warming up

Sensing the growing demand from foreign tenants, a small group of local developers have started green projects. If their projects succeed, more developers will get in on the act.

Prosper Centre in Beijing and LeSang Shopping Mall in Herbin, both LEED certified buildings built by local developers, are early examples. Both buildings are primarily occupied by multinational tenants.

Parkview Green, a Hong Kong-based developer, is aiming to construct China's first LEED Platinum-rated building in Beijing to attract international tenants. It has helped that multinational tenants are willing to pay a premium for green buildings.

Shenzhen Fountain Corporation, a local developer, has tied-up with US-based green building design consulting firm Environment Market Solutions Inc (EMSI) to develop two residential projects.

Link Hybrid, a LEED Gold certified green project in Beijing built by the Modern Group, is an example of wide scale use of geo-thermal technology to power the heating and cooling system of the building.

Shui On Land has several green projects upcoming throughout the country including the Knowledge Innovation Centre in Shanghai which is supposed to be completed in a few months and will be a LEED certified building.

Future plans

China is also preparing to introduce a comprehensive Energy Law which is likely to be passed by 2010. China Green Building Council, a public-private initiative launched last year by the ministry of construction, will be managing the green labelling system announced in 2006 and help create awareness about green buildings. The labelling system will be based on China's national Evaluation Standard for Green Building. A local certification system is likely to be less expensive and may attract more local developers.

Other plans announced by the ministry of construction include large scale application of renewable energy in building projects by tapping into solar energy and by using methane, straw and other alternative energy sources as an energy solution for rural areas.

The government has also indicated that it is considering tax rebates and financial incentives to encourage construction of green buildings.

It is likely that the government will set more aggressive green building targets in the 12th Five Year Plan (2011-2015) which is already being drafted. The government's current plans focus more on energy and as a result other green aspects such as water use have been neglected. China, which has a large agricultural economy and water is crucial for the sector, is now feeling the urgency to dramatically improve water efficiency. The 12th Plan may include stringent water conservation goals for green buildings.

Key challenges

China's ambitious green building plans also face a range of challenges. To begin with, it does not have the required expertise such as integrated building design capabilities. The government is trying to overcome this by initiating a number of international cooperation programmes with the U.S. and Western European countries which have more developed technology for green buildings. China has also been hosting and attending international green building conferences to stay abreast of global green building developments.

Perceived high cost is another barrier. When a World Business Council for Sustainable Development **survey** in 2007 asked the real estate developers and building professionals worldwide how much more they thought green buildings cost than normal buildings, the Chinese respondents said they thought certified green buildings cost 28% more. They were unaware that in China the average extra cost for a LEED certified building has been 3-5% more. This figure is similar to the global average incremental cost for LEED certified buildings.

Lewis says as long as the Chinese developers have a perception that green buildings cost a quarter more, they

will surely not go for green projects.

Lack of contractors, sub-contractors, engineers and supervisors who understand the concept of green buildings and an absence of a reliable supply chain of green materials is also an obstacle China needs to overcome.

Qian of EMSI says finding professional project team members and construction contractors in China who can properly implement green projects are big challenges.

Qian adds that though China is strong in energy saving technologies for buildings, it lacks expertise in integrated green building design. Integrated building design, a relatively new concept, not only optimises overall energy performance, it also focuses on all the aspects of sustainability and how all the key building systems function together to maximise benefits.

Will China become a green building power?

As of now, the green building industry is in infancy in China. But it is commonly believed that China plans to become a leader in the global green building industry, which promises to be worth hundreds of billions of dollars in a few years given the rising concerns over global warming. Qiu Baoxing, China's vice minister for the ministry of construction and a strong green building advocate, estimates the domestic green building market is already worth $213 billion.

"There could be a real green building revolution in China when green projects start spreading from tier-1 cities to tier-2 and 3 cities," says Lewis. "That will also prompt the cement industry and other building material suppliers in China to get on the green bandwagon. And then it will become cheaper for the entire world to make green buildings as China is the supplier of the world."

Though China's medium term outlook looks strong, in the near term it needs to focus on building green credentials before it can hope to build green buildings for the world.

China's green building targets

- Reduce building energy use in all cities by 50% by 2010 and 65% by 2020 (base year 1980)
- Top 1000 State Owned Enterprises Programme aims to improve energy efficiency in the largest SOEs by 2010.
- Retrofit 25% existing public and residential buildings to make them greener by 2020
- Use solar and other renewable energy sources to power 80 million square meter building space by 2010.
- Launch 200 demonstration and dissemination projects for scaled application of renewable energy on buildings.
- Heat measuring and energy saving retrofit in 150 million square meters in existing buildings in North China
- Organise 30 projects for low energy consumption and green building demonstration
- Develop energy saving management and retrofit demonstration for large public buildings

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