

Building Materials: Energy Efficient Green Building Materials

INDUSTRY OVERVIEW

The World Bank estimates that between now and 2015, roughly half of the world's new building construction will take place in China. The vast majority of these projects will be large – commercial office buildings between 100,000 and 150,000 square meters and residential developments spanning more than 500,000 square meters of construction area.¹ China's entry into the World Trade Organization and its subsequent investment boom are spurring new real estate development across the nation, and its successful bid for the 2008 Olympics will result in billions of dollars in new construction in Beijing alone. China's Ministry of Construction (MOC) estimates that China will double its current building stock by 2020.

In addition, the Chinese government expects one-third of its citizens, some 400 million people, to move from rural areas to cities over the next 15 years, placing China in the midst of the biggest rural to urban migration in human history. They are coming, and now China must build it.

The problem is that constructing and operating buildings can take a terrible toll on the environment. The energy consumed in manufacturing and transporting building materials, constructing homes and offices, and heating and cooling structures represent almost 45% of China's total energy use. Thoughtful design and construction, however, can minimize this impact. “Green” buildings - buildings designed for environmental sustainability - can reduce energy and water consumption by up to 70%. They can also cut land use by 25%.

China is building the equivalent of a new Shanghai every year. Acknowledging the resulting environmental drain, Chinese government officials claim that they are serious about making more of these new cities “green.” The government is also striving to make existing cities greener. For example, China’s 11th Five-Year Economic Growth Plan highlights, for the first time, energy conservation as a basic national policy. MOC has issued new regulations requiring all municipal buildings to reduce energy consumption by 50% by 2010. Beijing has ordered that all new buildings use half as much energy as older buildings.

SUMMARY

What does this mean for U.S. suppliers of energy efficient building materials?

China's green building industry is still in its infancy. Nevertheless, the government’s pronouncements indicate that the trend toward sustainable construction is irreversible. We are now seeing the growing consumer demand for environmentally-friendly homes and offices, green building councils, demonstration projects, and large green commercial projects. As further evidence, China is planning for a "Green" Olympic Games in 2008 and a "Green" World Expo 2010.

¹ From, “The Greening of China’s Building Industry.”

Stated simply, the construction industry is about business. The profit potential associated with green buildings should, more than any other single factor, sustain and drive China's trend toward green development. Developers should increasingly understand and appreciate the fact that green buildings are financially competitive with other, less environmentally-friendly projects. As a result, the demand for advanced technology and high-performance materials and systems should increase over time.

PROSPECTIVE REGIONAL MARKETS

Outside of Beijing, Shanghai and Guangzhou, the following cities below offer good opportunities for U.S. companies interested in entering and selling in the China market:

- (a) Shenzhen;
- (b) Tianjin; and
- (c) Zhuhai.

These cities share certain characteristics that make market conditions particularly favorable to green building materials industry:

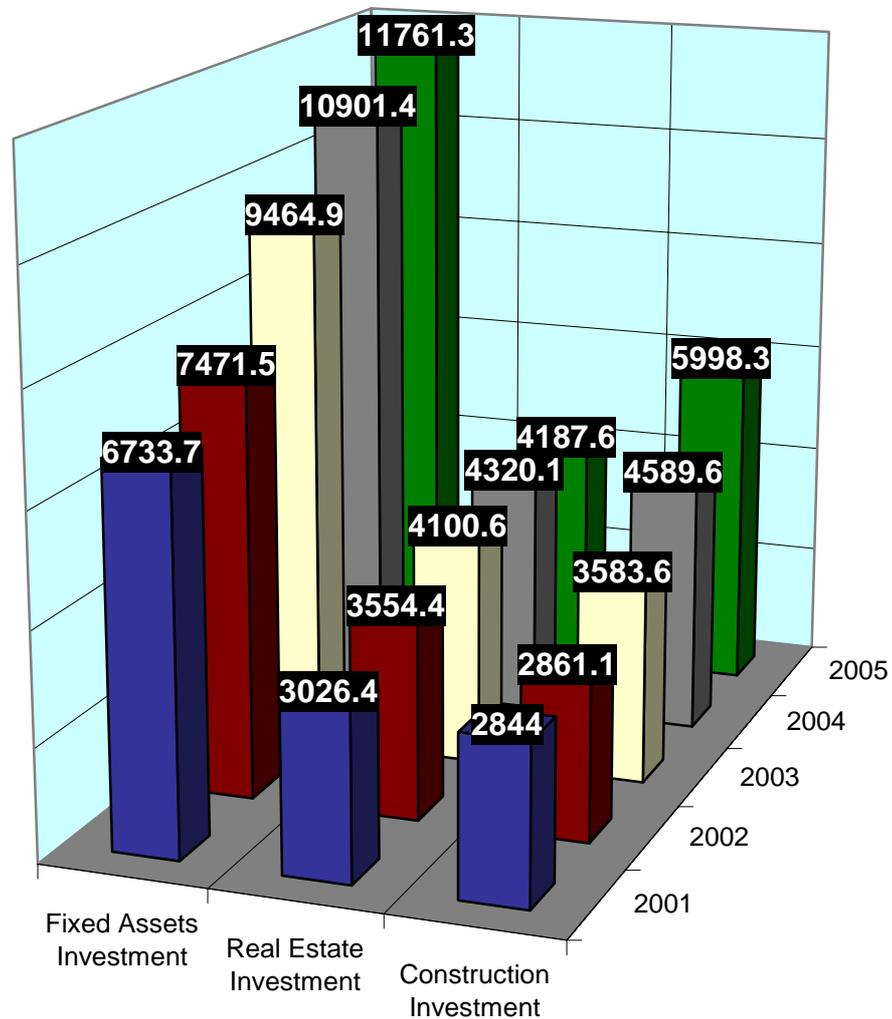
1. **All three cities are second-tier coastal cities.**
Currently in China, second-tier cities are growing in popularity and quickly becoming a focal point for development.
2. **All three cities have established hi-tech special economic zones that are aggressively pursuing new foreign and domestic investment.**
New residents in these zones will require newly-constructed facilities, which may include office buildings, research and development centers and/or manufacturing facilities. Moreover, foreign companies are often required by their own corporate policies to meet the environmental and energy efficiency standards of their home countries when they construct (or even lease) facilities overseas.
3. **All three cities have green building projects currently underway.**

General Market Conditions

The selected cities have all seen general growth trends in key economic indicators such as Gross Domestic Product, Foreign Direct Investment and building specific data. City specific information follows.

SHENZHEN

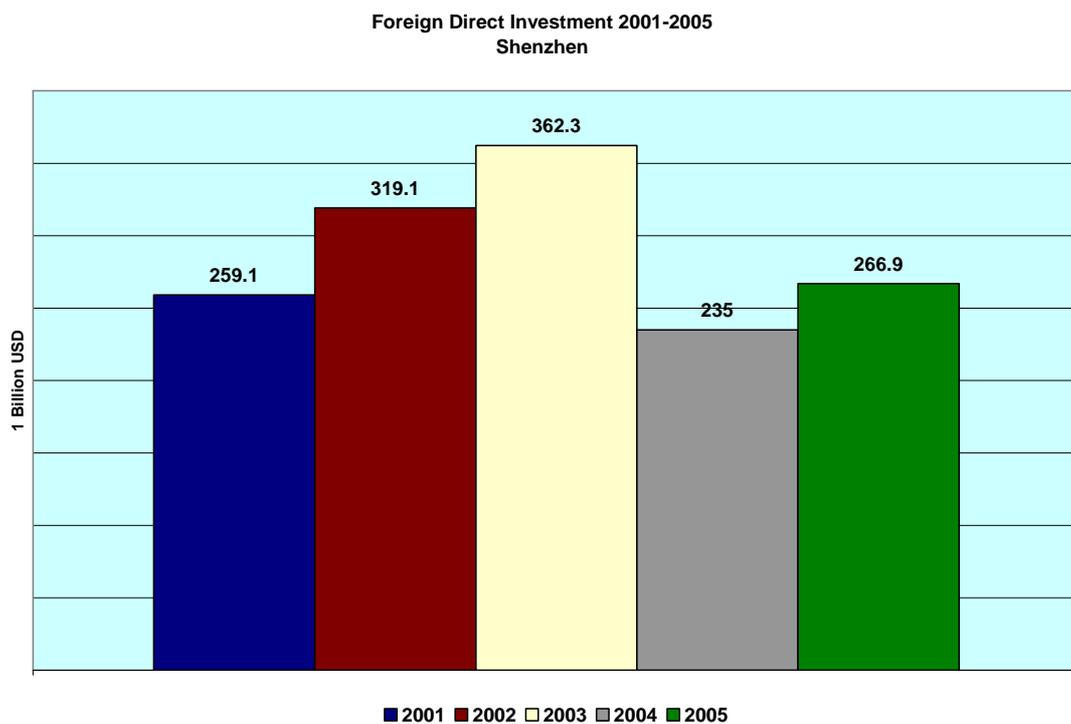
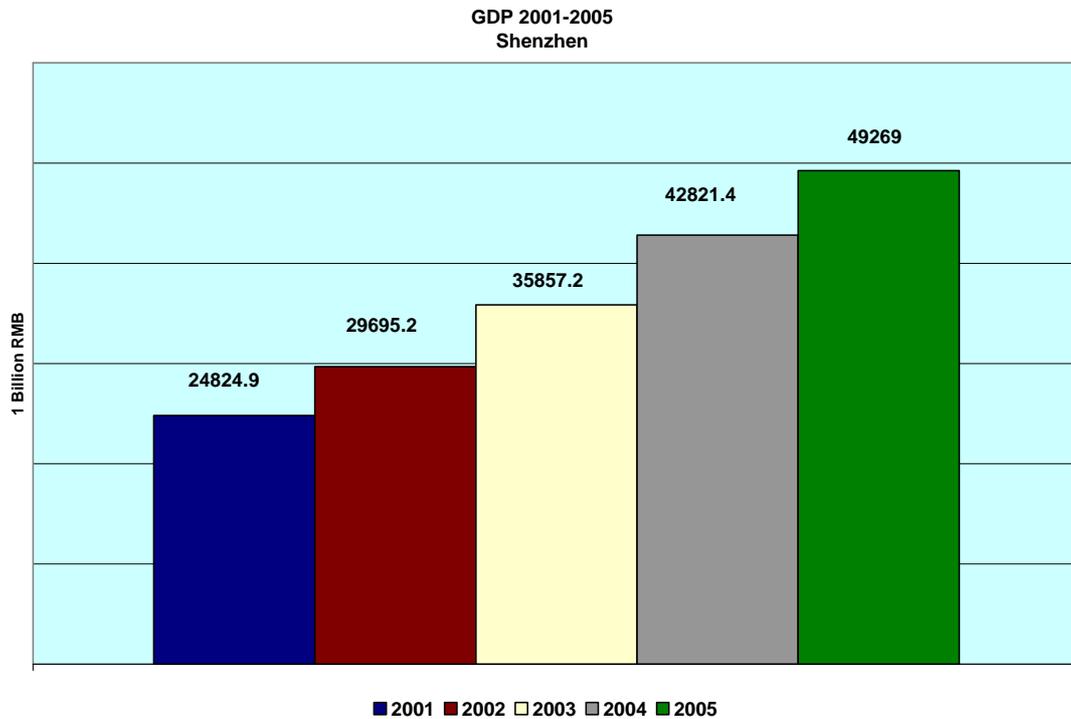
Shenzhen Investment Trends
(1 Billion RMB)



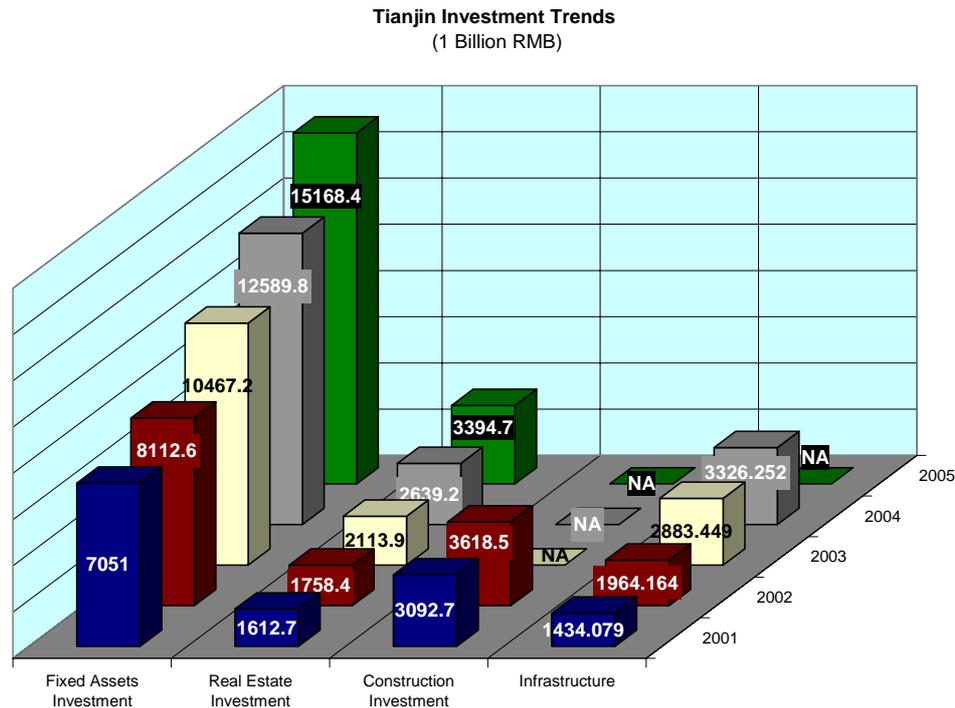
Shenzhen has seen steady growth in all the critical growth indexes since 2001. Currently, there are several developments and initiatives underway signaling a trend toward continued growth. These include:

1. **Financial Incentives** – The Shenzhen Municipal Government recently announced interest-free mortgages for hotels that install thermal ice storage systems--a technology that shifts energy consumption to off-peak hours.
2. **Tiger (Tai Ge) Service Apartments** – A 28,000 square meter high-end residential development in the Shekou District of Shenzhen, developed by China Merchant Real Estate Co., Ltd. This development uses high-performance chillers with an energy recovery system and low emissivity window glazing.

3. **Shenzhen Green Building Association-** This is a potential partnership between the Shenzhen Municipal Government and China Merchant Real Estate Co. Ltd.
4. **Municipal Green Programs-** The National Development and Reform Commission is working with the Shenzhen Municipal Government to develop a municipal green building program and a high performance green building demonstration project.



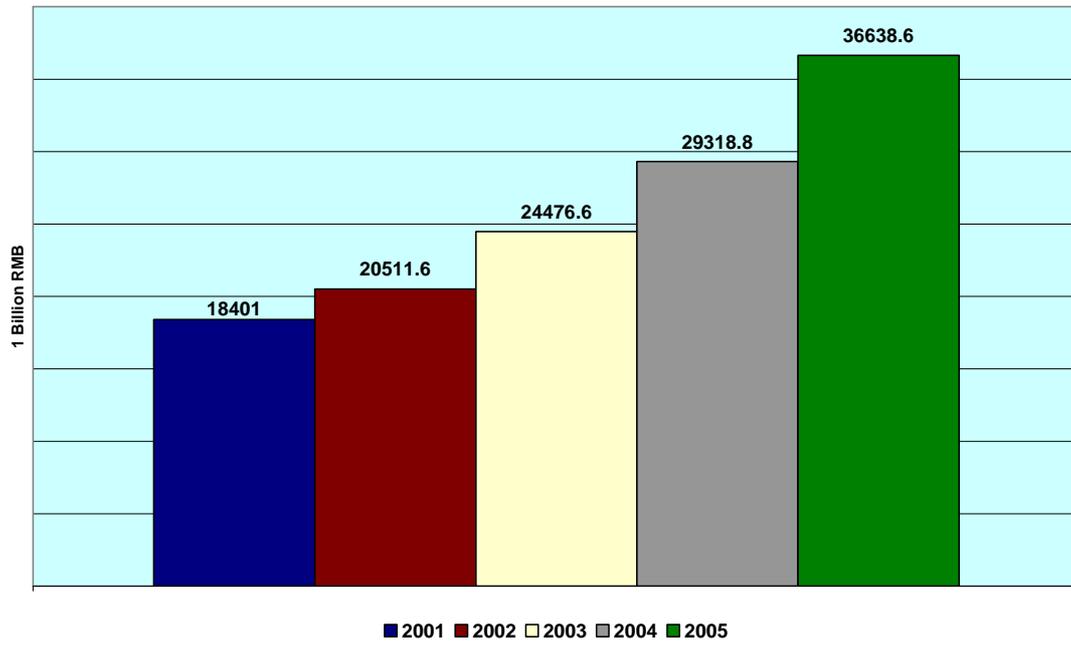
Tianjin



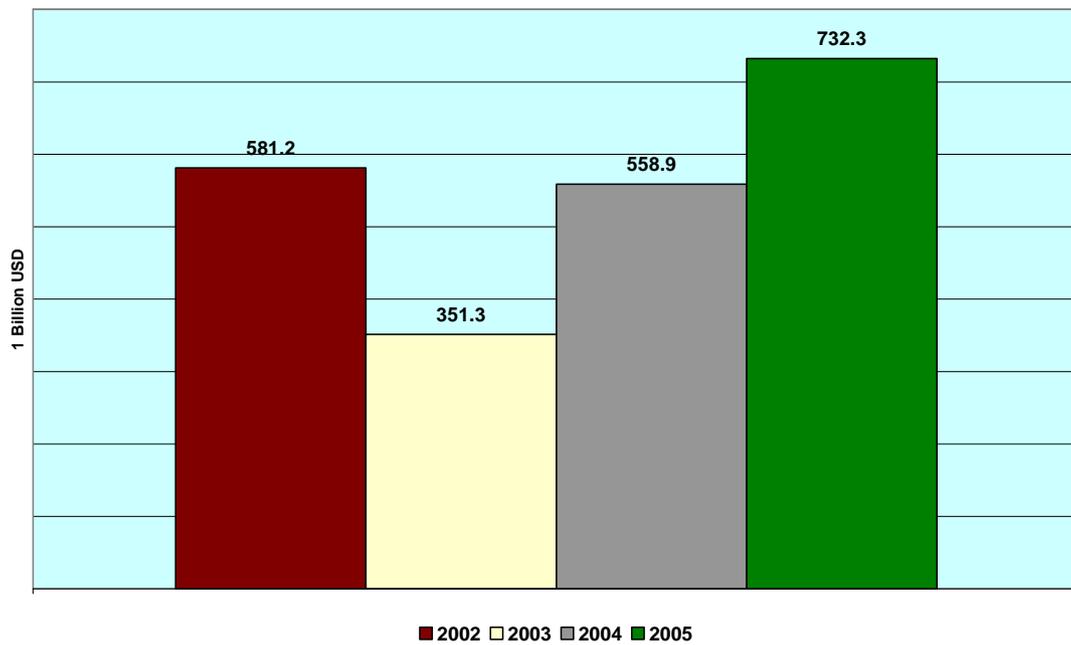
The growth trends in Tianjin are bolstered by Tianjin's proximity to the capital city of Beijing, as well as specific development projects underway.

1. **China Intelligent and Green Building Council** – While slated for establishment in Beijing, this body will likely also oversee or influence Tianjin's regulations.
2. **Haihe New Economic Development Zone**- During the implementation of the 11th Five-year Plan period (2006-2010), 10 residential complexes will be built. By 2007, the Tianjin Government will have completed the infrastructure for the upscale area of the Haihe River New Economic Development Zone and the mid-tier project will begin after the completion of the upscale area in 2007. By 2010, economic and trading facilities covering approximately 4.8 million square meters will include a street-commercial area designed to evoke ancient Chinese culture and commerce, the new Phoenix Shopping Mall, the Aquatic Sports World, Heping Business Square, Tianjin's South Railway Station, the Central Business District, and the Canal Business & Trading Square.

GDP 2001-2005
Tianjin

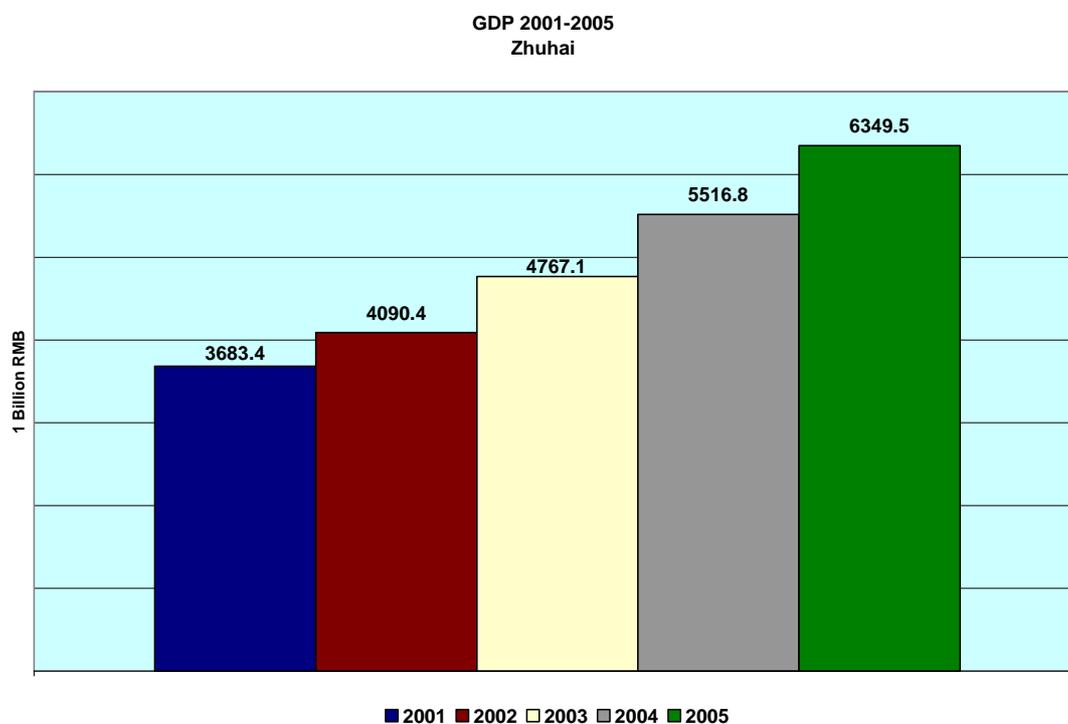


Foreign Direct Investment 2002-2005
Tianjin



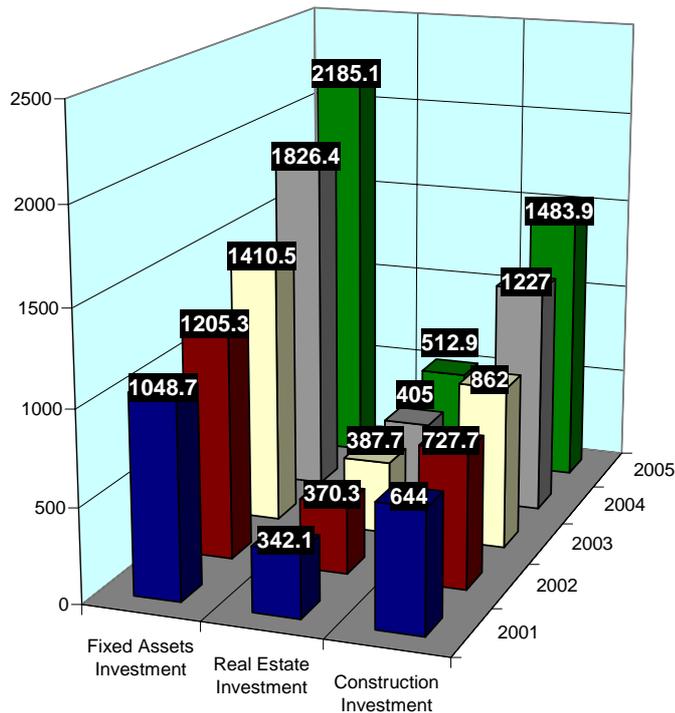
Zhuhai

Although Zhuhai is a smaller city compared to Shenzhen, it boasts an impressive rate of growth. In 2005, the city's regional GDP reached RMB 63.458 billion, an increase of 13.1% over the same period of the previous year. The per capita GDP in terms of permanent residents was RMB 45,258, or US\$5,525 when calculated at the current exchange rate.



Zhuhai's construction industry is growing rapidly. The output value of the construction sector by qualified enterprises was worth approximately RMB 5.154 billion in 2004, representing a 19.5% increase. The completion output value for the whole year was RMB 3.227 billion, an increase of 27.48% over 2003. The total floor space under construction was 5.831 million square meters, an increase of approximately 67.87% over the previous year.

Zhuhai Investment Trends
(1 Billion RMB)

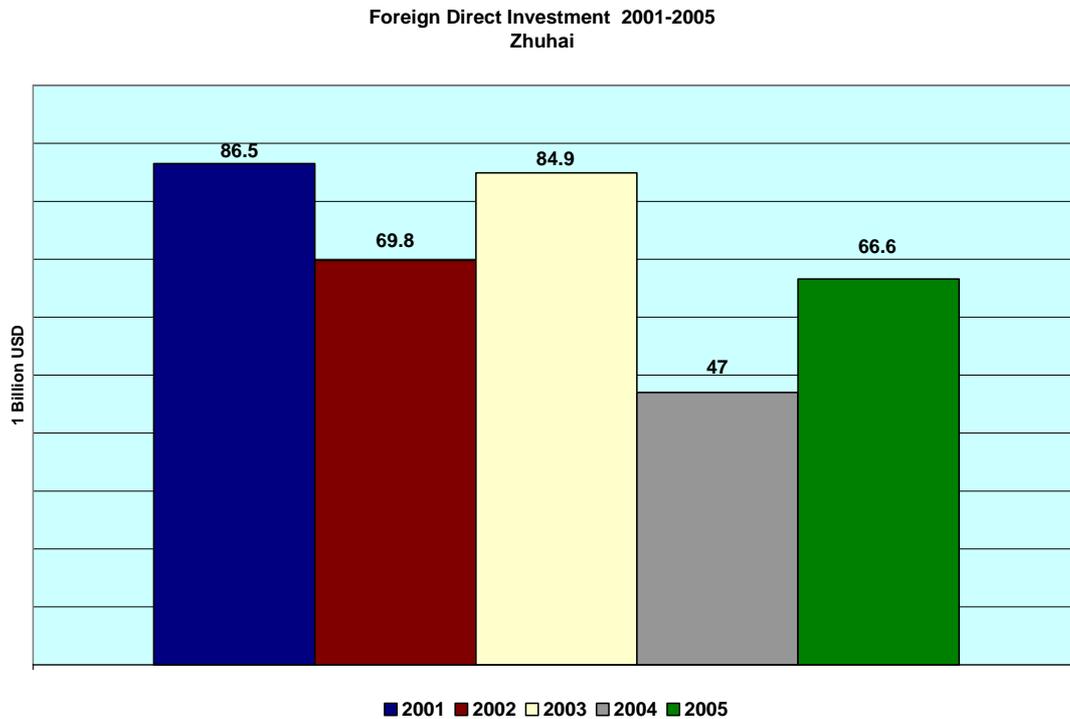


There are numerous projects underway in Zhuhai that make it a likely target for continued growth in the green building sector.

1. **Leadership in Energy and Environmental Design (LEED)**--Zhuhai is working with various local refrigeration associations to develop a South China Green Building Association that would create a “Chinese Leadership in Energy and Environmental Design (LEED)” certification program and be a part of the World Green Building Council.
2. **Energy Conservation Fund** – The Zhuhai government will set aside RMB 4.8 million annually toward energy conservation renovation for heavy chemical industries in the port area and hotels in Zhuhai city.²
3. **The 11th Five-year Plan**- The Zhuhai government will implement the following projects by 2010:
 - a. Six new high schools and nine primary schools;
 - b. A public cultural complex will be constructed to include the Zhuhai City Exhibition Center, the People’s Art Building, the Zhuhai Art Gallery, the Antique Building, a Famous People’s Memorial, the Zhuhai City Urban Cultural Square, and the Zhuhai Urban Planning Exhibition Center;
 - c. Sports recreation areas to exceed 10000 square meters; and

² From the China Energy Conservation website.

- d. Ten municipal parks, including Haitian Park, Siao Swamp Ecological Park, community-level parks, and greenlands will be developed, refurbished or expanded.



CONCLUSION

It seems that the best strategy for U.S. suppliers of energy efficient building materials is a broad, project-based approach to the Chinese market that targets buyers, developers and designers from the Mainland and Hong Kong. Some experts believe that green construction can be successful in China because it sells whole projects and not individual products as competitive investment opportunities. Higher capital costs associated with many energy efficient technologies can be “absorbed” by the many economic tradeoffs.³ Where possible and appropriate, U.S. suppliers should strive to differentiate themselves by offering Chinese real estate developers a project that includes not only architectural design consulting, but also equipment procurement, financing, and risk management.

Best Prospects

Effective January 1, 2006, MOC’s Residential Construction Energy Conservation Management Rules encourage the development of energy efficient technologies and products. These items include the following:

³ From, “Exporting Green Development Technologies to China.”

1. wall materials;⁴
2. insulation technologies and products;
3. doors and window insulation;
4. central heating and cooling systems and controls;
5. solar and ground heating and other renewable energy sources;
6. energy efficient lighting; and
7. energy efficient air conditioning.

When translated down into specific products, these new rules indicate that U.S. suppliers new to China should expect to see a growing demand for double glazing and insulated window frames, wall insulation, roofing technologies and sealants.

Prospective Buyers

Industry experts note that residential developers generally perceive the public relations value in building “green,” and they are acutely aware that China’s rising middle class is demanding more comfortable and healthier living and working environments. Nevertheless, the short-term opportunity is with the commercial building market, where developers: (i) have significantly higher budgets; (2) are more image-conscious; (3) are more likely to provide central heating (e.g., in Shanghai, heating and cooling are not required for residential units); and (4) benefit financially from the energy savings.⁵

Key Suppliers

Foreign companies face little or no domestic competition in high-end energy efficient building materials. Many domestic firms manufacture environmental building products, but the quality is generally inferior unless such products are manufactured using foreign technology. Moreover, this domestic production is almost exclusively for export. Domestic producers are competitive in low-tech products, such as aerated conclave bricks, solar thermal systems, and bamboo flooring.

Many of the leading suppliers of high-performance building technologies and products, particularly in the area of energy, are already operating in China. These include: TRANE, Carrier Corporation, and York International Corp. for heating, ventilation, and air conditioning equipment; Delta plc, General Electric Co., Honeywell, Johnson Controls Inc., and Siemens AG for building control systems; and Pilkington plc for window glazing. Other potential markets remain untapped.

Trade Events

1. **The 3rd International Conference on Intelligent Green and Energy Efficient Building & New Technologies and Products Expo:** March 26-28, 2007, Beijing International Convention Center; <http://www.sigbc.com>; Tel: 86-10-58933559; fax: 86-10-58933632
2. **China Eco Expo:** April 4-7, 2007, Beijing International Exhibition Center; <http://www.ecoexpo.com>; Tel: 1.818.906.2700; fax: 1.818.232.7281

⁴ The most commonly used wall material in China is solid adobe. The government has now promulgated a policy that prohibits all cities from using solid clay and adobe, and to instead rely upon wall materials with low energy consumption, good light transmission and heat insulation.

⁵ Id.

3. **The 12th China International Exhibition for Building Materials Exhibition:** May 9-12, 2007, Beijing Exhibition Center
The 6th Beijing International Green Building Materials Exhibition: May 9-12, 2007, Beijing Exhibition Center; ccpit@chinabuilding.org; <http://www.chinabuilding.org/EDefault.aspx>; Tel: 86-10-8836-5652/51; Fax: 86-10-8836-5655
4. **The International Building & Construction Trade Fair 2007 and The Kitchen & Bath China 2007:** May 23-26, 2007, Shanghai New International Expo Centre; <http://www.wes-expo.com.cn/building/2006/intro.asp>; Tel: 86-21-32224777; fax: 86-21-62557740
5. **2007 China (Shenzhen) International Green Building Paint Exhibition:** April 5, 2007; Shenzhen Convention & Exhibition Center; http://gz.jc001.cn/scripts/info/exhibit/view_41796_002002002.html ; Tel: 86-755-25191362; 86-755-25191311
6. **2007 Tianjin Building and Decorating Materials Trade Exhibition; 2007 Tianjin New Insulation & Sound Insulation Materials Exhibition:** May 25-27, 2007, Tianjin International Exhibition Center; <http://www.china-pipe.com.cn/204/2006/1018/32003.asp>; Tel: 86-22-23309821; Fax: 8622-23308521
7. **2007 Jinlin (Changchun) 12th International Building Materials Trade Exhibition & Construction Energy-efficient Products, New Wall Materials Exhibitions:** April 12-14, 2007, Changchun International Exhibition Center; <http://www.cnbdw.com/news.asp?id=1765>; Tel: 86-431-4606153; fax: 86-431-4606162

Resources and Key Contacts

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<http://english.cbminfo.com/allfile/3/2006-9-9/news200699174424.asp>

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Hong Kong Trade Development Council, <http://www.hktdc.com>

China Building Materials Industries Association, <http://bm.cei.gov.cn>

Shanghai Urban Construction Group, <http://www.sucgcn.com>

Shanghai City Development Law Firm (Specializing in Construction and Real Estate),
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Tianjin

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Zhuhai

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