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Links and References

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URBAN DESIGN & GREEN BUILDING

Market Overview

By 2045, nearly 800 million Indians will be living in cities - more than the total population of Europe. Urbanization and the expanding Indian economy are creating a huge market for residential and non-residential construction, as consumers demand more houses, commercial spaces, shopping malls, hotels, other facilities and modern amenities. In property terms, this new demand translates into over 12 million homes, 600 shopping malls, 80 million square feet of offices and 200 townships, along with airports, hotels, hospitals and schools, all slated for construction by 2010.

As a result of this massive urbanization, the construction sector in India - the largest after agriculture - is poised to grow at the rate of 15-20 per cent annually for the next few years compared to the world average of 5.5 per cent. This record high growth is also due to the Government of India's decision to allow 100 per cent foreign

Year	Projected Certified Green Buildings (NOS per year)	Estimated Market Potential in Million US\$
2006	20	80
2007	50	200
2008	150	500
2012	1000	4000

Source: Green Buildings in India Emerging Business Opportunities. February 2008, CII
http://www.igbc.in/igbc/mmbase/attachments/378/Green_Buildings_in_India_-_Emerging_Business_Opportunities.pdf

direct investment in real estate development projects.

The development of green buildings is expected to rise sharply over the next few years. Sustainable development is now a key focus of the construction industry in India, as it enters a boom phase. The Indian Green Building Council estimates the demand for green building materials and equipment will reach US\$4 billion per annum by 2010. This is only for LEED rated buildings. Other buildings which

use green materials and equipment raises the overall market potential ten-fold.

The Green Building Movement spearheaded by CII Godrej GBC has come a long way. From a green building footprint of 20,000 sq. ft in 2003, today green buildings of over 25 million sq. ft. are being constructed all over India. More than 100 buildings have been registered in India under the LEED rating program.

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Opportunities

Many Indian firms are looking to foreign suppliers for innovative and environment friendly building materials and solutions. Indian firms are also working with local R&D institutions to develop new building materials and components, suitable to local conditions.

B.C. companies with expertise and products relating to composites and open prefab systems could find profitable business opportunities in India. Service opportunities include architectural and green design, energy modelling, LEED-accredited professional services, and building management systems.

The Jawaharlal Nehru National Urban Renewal Mission believes that over US\$60 billion will be spent for urban development in 60 cities in India by 2010. As well, the Special Economic Zone scheme offers incentives such as duty free imports and tax exemptions, and these require environment impact assessments. B.C. environment companies are well poised to offer their services in this area.

US giant DuPont has signed a memorandum of understanding with the Energy and Resources Institute (TERI) to promote green building in India. TERI designed the Green Rating System for Integrated Habitat Assessment, which is a tool endorsed by the Indian government as its national building rating system.

Market Overview *Continued*

Despite the growth potential in the Indian market there are significant barriers to building green, including increased costs and lack of design and construction skills required. Though architects have been adopting some green principles, a widespread, integrated and holistic approach towards construction of green buildings has yet to emerge.

In addition, while the potential of the green building market in India is huge, the availability of materials and equipment is a major issue of concern.

Some green materials and equipment are readily available from domestic sources, such as fly-ash cement, fly-ash block, recycled aluminium, recycled

steel, recycled tiles, low VOC (volatile organic compounds) paints and adhesives, bamboo based products, high efficiency cooling systems, building controls, green roof materials and recycled wood. However, there remains a large untapped market for green materials in India. Typical examples are: composting toilets, waterless urinals, low VOC adhesives & sealants, CRI certified carpets, FSC Certified wood, high albedo roof paints, BIPV, CTI certified cooling towers, etc.

MARKET ENTRY STRATEGIES

Many non-Indian companies operate through local sales agents for market entry, sales promotion and for liaison with the government. Companies considering establishing a manufacturing base in India to gain a competitive edge may prosper, as some customers prefer a local supply source.

The most successful foreign companies are those which have formed technical collaborations or joint ventures with Indian manufacturers.

COMPETITIVE ENVIRONMENT

The Government of India permits imports of building materials and products under an Open General License (OGL) system. The duty on building products is pegged at 15 percent, but the government intends to reduce progressively import duty rates.

The government permits Foreign Direct Investment up to 100 per cent for development of integrated municipal construction, including housing, commercial premises, hotels, resorts, city and regional level urban infrastructure

facilities such as roads and bridges, mass rapid transit systems and manufacture of building materials. Development of land and provision of allied infrastructure will form an integrated part of township development.

The Bureau of Indian Standards and the Indian Bureau of Mines are the main authorities for issuing and maintaining the codes/standards pertaining to safety and other practices in the Indian construction industry. However, most of these standards are similar to worldwide

standards.

LEED standards currently available or under development in India include: new commercial construction and major renovation projects (LEED-NC), existing building operations (LEED-EB), commercial interiors projects (LEED-CI), core and shell projects (LEED-CS), homes (LEED-H), and neighbourhoods development (LEED-ND).

REGULATORY ENVIRONMENT

In 2007, the Indian government launched the Energy Conservation Building Code (ECBC) aimed at bringing down the energy consumption of commercial buildings through the efficient design and use of resources.

The Code sets minimum energy performance standards for external wall, roof, glass structure, lighting, heating, ventilation and air conditioning of commercial buildings in all five

climate zones in the country. The state governments will have the flexibility to amend ECBC to suit local or regional needs. The estimated reduction in energy use for new buildings ranges between 25 per cent and 40 per cent.

The Code provides three options for compliance: compliance with the performance requirements for each subsystem and system; compliance with the performance requirements

of each system, but with tradeoffs between subsystems; and building-level performance compliance.

Initially the Code will be voluntary. Following implementation experience, the Code will be made mandatory. Nationwide mandatory enforcement of ECBC will yield a saving of US\$1.7 billion kWh per year.

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