

GREEN BUILDING PRODUCTS

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Summary

There has been a growth in the usage of environmentally friendly building products during the last five years. One reason is that developers find “green” features economical in the long run, despite their initial higher installation costs. Another is that they help attract multinational corporate tenants. Government incentives and brand building concerns are also contributing factors.

Best sales prospects include those products that help to save energy, recover heat, reduce waste or maintenance needs, improve indoor air quality or come from sustainable sources.

More green buildings have been built in Hong Kong in the past five years. T5 lamps, variable speed pumps, heat recovery systems, service-on-demand features, advanced window glazings and motion sensors have become more common. Building integrated photovoltaic panels also have increased in usage. The market for green building products has great potential.

Market Overview

Public awareness of environmental protection is developing as Hong Kong people suffer from air and water pollution resulting from manufacturing plants in the Pearl River Delta region. Also, the Hong Kong Government has put much effort into educating its people about the importance of protecting the environment as its landfill sites are filling up sooner than they should.

In the construction and building sector, usage of environmentally friendly and energy-saving products and features has increased in recent years. Developers are becoming more concerned about building an environmental image. They also want to attract multinational corporate tenants who prefer features that will save energy, reduce waste and increase productivity in their commercial projects.

Among the companies embracing environmentally friendly design features is Henderson Land Development, a joint venture developer of International Finance Center (IFC) in Central. According to Henderson, it does not really cost a lot more to incorporate green features in the design stages. For example, IFC cost only about USD141 per square foot, which was in line with the cost of traditional building projects. Henderson noted that some environmentally friendly features were expensive to install but were economical in the long run. For example, the

sea water-cooled air conditioners installed at IFC were twice as expensive as traditional coolers but cost 30% less to run.

Government regulations are playing a pivotal role in shaping the design of residential buildings in Hong Kong. Balconies and sky gardens are now a feature of many new homes.

They were not so common in projects completed before 2001. The government provides incentives to encourage developers to adopt green building features and construction methods to reduce waste. The incentive exempts green features from the calculation of the gross floor area of a property, which grants developers extra floor space to boost the market value of properties.

In the last five years, growth in demand has been significant in environmentally-friendly products, e.g., T5 lamps, variable speed pumps, heat recovery systems in HVAC, service-on-demand features, advanced window glazings, and motion sensors. Metal formworks have also extensively replaced timber. More pre-fabricated elements are used to allow cleaner construction sites. Use of photovoltaic panels has also increased, particularly in government buildings, though not on a big scale. The market for green building products in Hong Kong, however, is far from maturity and is therefore full of potential.

Regulations and Incentives In Hong Kong, there are a number of statutory codes guiding construction and building professionals, i.e., the Code of Practice for Overall Thermal Transfer Value (OTTV) by the Building Department, and the Technical Guidelines and Memoranda by the Environmental Protection Department.

There are also environment and energy non-statutory codes and incentive programs offered by the Government, including:

- Environmental targets of the Architectural Services Department
- Energy codes by the Electrical and Mechanical Services Department
- Guidance Notes for the Management of Indoor Air Quality in Offices and Public Spaces by the Hong Kong Government
- Demand Side Management Scheme of the Power Company

On the private-sector front, there is a voluntary certification scheme that began in 1996 called the Hong Kong Building Environmental Assessment Method (HK-BEAM). HK-BEAM recognizes improved environmental performance in building design and management.

Through May 2005, there have been 100 buildings or over 60 million square feet of floor space assessed by HK-BEAM. These include 52,000 residential units, equivalent to the homes of 150,000 people or slightly over 2% of Hong Kong population. The numbers make HK-BEAM the most widely used scheme of its kind in the world on a per capita basis.

In August 2005, the Hong Kong Government's Building Department also launched CEPAS(Comprehensive Environmental Performance Assessment Scheme), a new buildings' rating system. The scheme will be on a voluntary basis, rating buildings on a "five-star" grading system. The rating system is based on 34 criteria in eight categories, ranging from hygiene and ventilation to waste management and cultural preservation during the design and construction stage. The best buildings will be given the platinum label. The other grades are gold, silver, bronze and unclassified. The certificate will be valid for five years. This system is meant to become a benchmark for all construction in Hong Kong, making environmental awareness a business plus.

Market Trends

The following lists the best sales prospects for green building products or features:

Building Integrated Photovoltaic Panels

Most of the commercial buildings in Hong Kong are vertical curtain-wall buildings. These types of buildings require a lot of energy, and also reflect back a lot of solar energy. If the surfaces of curtain-wall buildings are replaced with photovoltaic panels, which can be put on walls or windows, the solar energy produced can be used as a renewable energy source.

Electrical & Mechanical Services Department's (EMSD) new headquarters building used more than 2,300 Building Integrated PhotoVoltaic (BIPV) panels, the largest number in a project in Hong Kong. The panels, connected with the distribution network of the utility company, can generate a maximum of 350kW of electricity and produce 300,000 to 400,000kWh of electricity per year from sunlight. This is roughly equal to the total electricity consumption of 90 families in Hong Kong or 3 – 4% of the electricity consumption of the building.

One Peking Road project, a private commercial development, has installed 1,444 BIPV panels to absorb solar energy for operating an automated window blind system.

Heat Recovery Devices

Air conditioning accounts for 32% of the total electricity consumption in Hong Kong. Nondomestic buildings consume 72% of air conditioning. Hong Kong's

total electricity consumption grew by 52% from 1990 to 2000, while the electricity consumption by air conditioning grew about 55% from 27,253 Terajoule (TJ) to 42,225 TJ during the same period. The use of air conditioning is expected to grow further due to Hong Kong's increasing population and economic activities. Measures to improve Hong Kong's energy efficiency, and minimize the emission of greenhouse gases from power generation plants are very important.

Some of Hong Kong projects use heat reclamation technologies, such as desiccant total energy wheel and heat recovery chiller. In the Bank of China, reclaimed heat is used to preheat the incoming water supply for winter heating.

In EMSD's new headquarters, slurry ice is used as an energy recovery medium. During offpeak periods of electricity demand, slurry ice is produced and stored in five slurry ice tanks.

During peak periods of electricity demand, the ice melts and absorbs thermal heat, making it possible to reduce electricity consumption and also reduce generator and transformer requirements.

Water-cooled Air Conditioning System

In 2000, the Hong Kong SAR Government conducted a pilot scheme on water-cooled air conditioning system using evaporative cooling towers in non-domestic buildings. Annual saving in air conditioning cost as compared to air-cooled air conditioning system was found to be at least 20%. Since then, the demand for cooling towers and water-cooled chillers has increased. Water-cooled chillers save 30% more electricity than air-cooled chillers and have an output ratio nine times that of air-cooled chillers. Water cooled systems will save energy and minimize space usage, a common issue in Hong Kong.

Transparent Glazed or Double-glazed Curtain Wall

Windows with advanced window glazing admit available light while minimizing unwanted solar heat gain. They can help to reduce air conditioning loads, which dominate electricity use in Hong Kong, since air conditioning units are run virtually year-round for commercial buildings.

The Wanchai Police Headquarters, installed with double-glazed curtain wall, which provides excellent thermal insulation, expects to reduce future operational costs. Overall Thermal Transfer Value (OTTV) achieved is 19.10W/square meters, which is significantly better than statutory requirements.

The Three Pacific Place project also has transparent glazed curtain walls that saves energy costs by providing insulation to reduce heat while letting in more natural light.

Grey Water Recycling System

Wastewater from showers, washbasins and kitchen areas, i.e. grey water, can be collected, treated and reused for flushing toilets, for example, Penny Bay Police Station collects rain in basement container, filters and reuses it for washing cars.

Water and Electricity Conservation through Motion Sensors

Infrared motion detectors that can switch off lamps and water taps and/or operate escalators have increased in demand. Motion sensor urinals and dual flush for ladies water closets that help water conservation are also becoming popular. Presence sensors for automatically regulating air-conditioning and lighting systems can help save on air-conditioning and electricity consumption and promote energy efficiency.

Energy-saving Lighting Equipment and Motors

High frequency ballast for light fittings can reduce the use of electricity. Bank of China uses high frequency ballast for light fittings in its office and public areas. Cityplaza 3 & 4 buildings were retrofitted using T5 electronic ballast.

High efficiency motors for fans and pumps in building services systems are becoming common. Variable speed drives for chillers, AHUs, fans, water pumps, escalators, and elevators help to save on energy by adjusting output to demand.

Sunshades

Sunshades minimize direct sunlight penetrating into the building in the summer and thus reduce the energy required for providing air conditioning.

Materials from sustainable source

PVC-free carpet; low VOC content paint, adhesive; computer floor made of recycled steel; and timber from sustainable sources are good for use for interior decoration projects.

Building Products that Improve Indoor Air Quality and Environment

Sick Building Syndrome or building related illness is increasingly recognized as a common problem. After experiencing SARS in 2003, Hong Kong people have increased their concerns about the air quality both inside and outside buildings.

Several multinational corporations have started employing independent consultants to examine the environment and energy efficiency of buildings before they sign their leases.

Although not many companies have adopted the practice, it is a sign that they want more than just space efficiency.

More corporations are issuing reports under sustainability reporting guidelines drawn up by the independent Global Reporting Initiative (GRI), a collaborating center of the United Nations Environmental Program. These corporations' demand for environmentally friendly regional offices is increasing accordingly. Environmental designs have become part of the design process for new office design. However, Grade-B office and residential sectors have been slow to follow suit.

Among the companies that have issued reports under GRI guidelines is the investment bank, UGS, which signed a 10-year lease at Hong Kong's tallest building, Two IFC. The concept of corporate compliance has significantly changed the decision-making process on office relocations. International firms are now willing to pay considerably more to ensure that their staff works in better and safer environments. Office rents in Hong Kong have gone up quickly over the past few months, but these companies would rather take the time for analysis and pay higher rent.

Other Environmentally-friendly Procedures and Building Products

One of the latest changes in the construction of private residential projects is the use of prefabricated façade panels – a more environmentally friendly method that replaces traditional on-site wall-building methods. Developers in Hong Kong, such as Cheung Kong (Holdings) and Henderson Land Development, are keen to use prefabricated façade panels.

Sun Hung Kai Properties are studying the use of prefabricated facades when consulting on new projects. The following list the metal formworks and pre-cast elements used in some

Hong Kong projects:

- Self-climbing wall forms and system formwork for core wall construction
- Aluminium mini-table form system for casting post-tensioned concrete slabs
- Steel moulds for composite columns & permanent steel formwork and staircases
- Pre-cast beams, slabs, stir and façade components (which include windows, sun shades and balconies)
- Lost form construction in which the outer skin of tiled concrete is used as the form

- Proprietary wall systems made of light gauge galvanized steel stud framing, fibre cement sheet lining and lightweight concrete core mix fill for internal non-load bearing partitions
- Reusable and recyclable site safety installations such as steel safety barriers, catch fans and safety screens
- Prefabricated building services which eliminate cut-offs and reduce packing materials.

Examples include, horizontal water supply & drainage and fire service piping systems, full story height vertical pipe duct modules and air handling ducts.

Competition

Green building materials is a “young” sector where room exists for companies to compete.

The local industry believes that U.S. companies excel in window glazing products, motion sensors, heat recovery products and building products that improve indoor air quality.

There are, however, areas where U.S. products can improve. According to EMSD, building service products from Europe enjoy a long history of popularity in Hong Kong. For example, products from Germany and the United Kingdom capture the majority of the air handling units (AHU) market, followed by Japanese products. One of the reasons is because specifications, written in accordance with the British standard, facilitate marketability of European-made products in Hong Kong. In addition, German made AHU (e.g. Nickel) is successful because of the penta-post structure, which enhances installation efficiency. Also, the fully modular and removable components in the AHU make maintenance much easier.

Japanese products, on the other hand, excel in their computer-controlled technology, which enables variable refrigerant flow and hence helps to reduce energy costs. U.S. companies should consider modifying their products to suit the needs of the Hong Kong market.

Some China-made products are also competitive in Hong Kong. A few examples are:

electrical conduit, electronic ballast and florescent lights. China brand “LEB”, is known to be a reliable electronic ballast, that can overcome the high harmonic distortion problem that American brands have. Also, the China-made T-5 fluorescent lamp (e.g. Huafuda) has good parabolic reflection and an excellent promotional scheme to replace clients’ existing lighting with the energy saving T-

5 and electronic ballast. U.S. companies might consider similar promotional plans to help their products penetrate the Hong Kong market.

For photovoltaic panels, major brands sold in Hong Kong are from Germany, notably Siemens, RWE, and Saint Gobain. Other brands include, Shell Power (US) and Sharp (Japan). BP Solar, which has many manufacturing facilities in the world, is also one of the major suppliers. In 2004, Siemens, now part of Shell Power, captured the majority market share in Hong Kong.

In general, German-made BIPV panels are more popular in Hong Kong because German manufacturers are willing to produce custom-made panels. US manufacturers, on the other hand, produce standardised panels for the vast US market. US-made panels traditionally have a small market share in Hong Kong. There is a general impression that Japanese solar panels are the most price-effective and German-brand panels are most expensive – by about 20%. US products fall in the mid-range price level. Hong Kong, like all of Europe, uses 60

Hz and 220 volts. Therefore, European inverters are more applicable for the market.

End Users

To estimate the acceptability of the “green” concept, it is useful to take a look at the activities of some influential end-users and authorities in the building and construction industry.

Property developers

Swire Properties, a leading property developer, is very environmentally conscious in its adoption of building materials and construction methods. The company uses aluminum formwork extensively in its projects. Most of the aluminum formwork is extruded in China and Malaysia, using ingot from New Zealand and Australia. When timber formwork is to be used, the timber is sourced from certified forests in Australia and New Zealand. Indeed, two of its projects, Lincoln House and Oxford House, were awarded “excellent” ratings by the HK-BEAM. In the Lincoln House project, clear anodised aluminum cladding with high performance, solar reflective and heat absorbing glazing was used as the exterior finish. In Oxford House, all 41 floors contain a raised floor system, DDC/VAV air conditioning system subdivided into 18 zones, fiber optic block wiring, facilities for satellite interactive multimedia service and an inter-floor communications trunking telephone system. Swire is interested in a wide range of environmentally friendly building products, and the company is of the opinion that products for interior finishes will experience market receptivity fairly quickly.

In response to 2001 government proposed incentives, Sun Hung Kai Properties Ltd., one of Hong Kong’s leading property developers, included in its new

property developments balconies and “sky gardens”. It also included store-rooms and windows in lobbies, as well as facilities to manage rubbish disposal and collection in a more environmentally friendly way.

Henderson Land, also a leading property developer, has an in-house R&D team for evaluation of green building materials. The company focuses on “smart home” concepts, and some of the products it uses include green concrete, pre-cast uni-bathroom and light-weight dry wall systems. In addition, the company is exploring construction techniques that will save costs and labor. It is considering different design-and-build systems, including wall formwork, column formwork, climbform, stairform, post-tensioning and pre-cast concrete.

Government Departments

The Architectural Services Department (ASD) provides professional and technical advice on all matters in relation to government buildings, except public housing. ASD is actively promoting the use of green building materials. One of its on-going initiatives includes revision of its industrial benchmark for the use of volatile organic compounds (VOC) in the construction industry. ASD aims to scale down the limit of VOC content in internal and external use paint. It publishes general practice guidelines. The upcoming edition is to be released by January 2007. Also, the department is in search of solvent-based materials with low emission properties or with low formaldehyde content. In addition, it has conducted research with the Hong Kong Polytechnic University to examine radon hazards. All these initiatives of the ASD will help to increase the demand for environmentally friendly coatings, paints, glues, adhesives, mortar and radon detecting equipment.

EMSD is interested in studying the application of heat recovery systems for energy saving purposes. Heat recovery facilities and heat pumps that can reclaim waste heat from chillers to produce hot water for heating have good market potential, as do heat exchangers. EMSD also conducted IAQ tests in 70 government buildings using 12 parameters. The exercise was for the purpose of examining the effectiveness of the voluntary IAQ guidelines, and deciding whether the standard should be adjusted in Hong Kong.

As mentioned earlier, the Buildings Department (BD) (the government regulator responsible for promulgating and enforcing building codes) has been actively in promoting green practices through revision of its building codes and various incentive schemes. In July 2000, it set up a special task force, named the Building Innovation Unit (BIU), to identify potential incentives that could be used to encourage the construction of green buildings. BIU is chaired by the Director of Buildings. Its members are very interested in learning new technologies and practices from other countries, including the United States.

The Housing Authority (HA) (the government arm providing housing for half the population of Hong Kong) has adopted a strategic approach to environmental issues. In 1998, through its Housing Department, it set up an Environmental Management System which involves staff representatives from different sections (e.g. design and construction, rental) to develop environmental performance policies, and monitor and coordinate the progress of implementation. Some of the environmental products that HA uses in its housing projects include energy-saving lamps in housing estates, energy-efficient floodlights for car parks, uPVC lined pipes for new housing (starting after 1994), non-ozone-depleting refrigerants in chillers, automated refuse collection systems, and pulverised fuel ash (PFA) added concrete.

The Department is also looking for replacement of uPVC windows and pipes since the manufacturing process has an adverse environmental impact. It is also interested in CFC/HCFC free roof insulation materials, dual flush toilet systems, and timber from sustainable sources or its alternatives. To reduce noise at construction sites, it will encourage the use of more prefabricated building elements in its projects.

Market Access

Regulations and Standards

Hong Kong is a free port and one of the world's best examples of an "open market economy".

The Hong Kong Government pursues economic policies of non-interference in commercial decisions, low and predictable taxation, government spending increases within the bounds of real economic growth, and competition subject to regulation and law. There are no restrictions on foreign ownership of capital, nor are there export performance or local content requirements. There are no import duties. Profits can be freely repatriated.

Hong Kong is a founding member of the WTO as well as a member of APEC. There is no legislation or practice which restricts access to the Hong Kong markets by foreign exporters or which mandates preference for locally manufactured products. Hong Kong companies (and the Hong Kong Government itself) do not have any predisposition to any one supplier -- and are far more inclined to purchase based on the terms of price, delivery, quality and service. Technical and safety standards are not used as a political or trade control mechanism, and they are normally accommodated with little difficulty.

Hong Kong and mainland China signed a Closer Economic Partnership Agreement (CEPA) in 2003, which became effective in January 2004. This is a free trade agreement under WTO and it gives Hong Kong companies preferential access to the China market. Initially, 273 types of products are covered in CEPA

and 90% of domestic export from Hong Kong can enjoy zero tariff. Unfortunately, since most U.S. brand air conditioning equipment is manufactured in China, the industry does not benefit from CEPA.

Useful contacts for inquiring about specific products:

US Department of Commerce Bureau of Export Administration
Website: www.bxa.doc.gov

Hong Kong Trade and Industry Department
Tel: (852) 2398-5554
Fax: (852) 2398-3747
Website: www.info.gov.hk/tid/e-index.htm

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
Hong Kong Chapter
<http://www.ashrae.org.hk>

Trade Promotion Activities Conferences and exhibitions in the air-conditioning sector scheduled to take place in Hong Kong within the next 24 months include:

Event Name: Asian Building Technologies 2006

Date: June 7-9, 2006

Venue: Hong Kong Convention & Exhibition Center

Organizer: Hong Kong Exhibition Services Ltd.
Unit 2010, 20/F
China Resources Building
26 Harbour Road
Wanchai, Hong Kong
Tel: (852) 2804-1500
Fax: (852) 2528-3103
Email: exhibit@hkesallworld.com
Website: http://www.asianbt.com/asianbuilding/f_index.html

Trade Journals:

Construction & Contract News (Monthly)
Trend Publishing (HK) Ltd
Room 901, C.C.Wu Building
302 Hennessy Road, Wanchai
Hong Kong
Tel: (852) 2802-6299
Fax: (852) 2802-6458

E-mail sales@building.com.hk
Website: www.building.com.hk

Building Journal Hong Kong China (Monthly)
Trend Publishing (HK) Ltd
Room 901, C.C.Wu Building
302 Hennessy Road, Wanchai
Hong Kong
Tel: (852) 2802-6299
Fax: (852) 2802-6458
E-mail sales@building.com.hk
Website: www.building.com.hk

Hong Kong Builder Directory
Times Publishing (Hong Kong) Ltd.
Block C, 10/F Seaview Estate
2-8 Watson Road
North Point, Hong Kong
Tel: (852) 2566-8381
Fax: (852) 2508-0603
E-mail: kenneth@hkbd.com.hk
Website: www.asiabuilders.com

Contractor's Guide
Upfront Associate
Unit 723, Metro Center
Phase II, 21 Lam Hing Street
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Construction News (every six weeks)
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Plumblin (monthly)
TPL Corporation (HK) Ltd.
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Seaview Estate
2-8 Watson Road
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Tel: (852) 2566-8381
Fax: (852) 2508-0072
E-mail: tpldir@hkbd.com.hk
Website: www.asiabuilders.com

Construction Enterprise Periodical
Autumn Harvest Publishing Company
Shop 5, G/F Jing Hui Garden
8 Aberdeen Main Road
Aberdeen, Hong Kong
Tel: (852) 2555-6114
Fax: (852) 2873-5039

Asian Review on Business and Technology
Alain Charles Publishing
Performance Press Ltd
8/F Bank of America Tower
12 Harcourt Road
Central, Hong Kong
Tel: (852) 2584-6212
Fax: (852) 2537-5636

Protection of Property Rights (IPR)
Hong Kong's commercial and company laws provide for effective enforcement of contracts and protection of corporate rights. The Intellectual Property Department, which includes the Trademarks and Patents Registries, is the focal point for the development of Hong Kong's intellectual property regime. The Customs and Excise Department is the principal enforcement agency for intellectual property rights.

To enhance the protection of intellectual property rights in Hong Kong, the Intellectual

Property (Miscellaneous Amendments) Ordinance 2000 amends the intellectual property laws to prevent piracy of copyright works. Starting from April 1, 2001, corporate copyright piracy activities are criminal offences in Hong Kong and individuals infringing the rights will be prosecuted.

Useful contacts:

Intellectual Property Department
24th and 25th Floor
Wu Chung House
213 Queen's Road East
Wanchai, Hong Kong
Tel: (852) 2961 6901
Fax: (852) 2838-6276
<http://www.info.gov.hk/ipd/>

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