

# C I N T R A F O R

## Working Paper 121

### **The Impact of Green Building Programs on the Japanese and Chinese Residential Construction Industries and the Market for Imported Wooden Building Materials**

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#### **Executive Summary**

Green or sustainable building programs incorporate the environment, the economy, and human aspects into the design and construction of a building. Green buildings are created through an integrated process where the site, the building design, the construction, the materials, the operation, the maintenance, and the deconstruction and disposal of a building are all seen as being inter-related with the environment. As a result of this integrated process, it is thought that buildings can be made more environmentally friendly, more cost-effective and more resource and energy efficient, while providing a healthier living and working environment. Green building programs are slowly but surely emerging around the world in developed countries. The focus of this report is on the green building programs in Japan and China. The Japanese green building program is called CASBEE-Sumai (House) and the green building program in China is the Chinese Evaluation Standard for Green Building (also called the Three Star System). In addition, two other programs that have the potential to influence materials use in residential housing (the 200 Year House program and the Eco-Points program) have been adopted in Japan. This report provides an overview of these programs, explains the sections of the programs that relate to wooden building materials, and discusses how these programs could affect the use of wooden building materials in Japan and China.

To better understand builder's, architect's and design professional's perceptions and attitudes towards green building programs in China and Japan, surveys were conducted in both countries. A total of 406 surveys were collected in Japan and 150 surveys were collected in China. In addition, a series of informal interviews with building professionals were carried out in each country. These results of the surveys and interviews are summarized in the following report.

#### **Japan**

While Japanese housing starts declined substantially in 2009, they exceeded those in the US for the second year in a row. With approximately half of its housing starts being constructed from wood, Japan remains an attractive market for US manufacturers and exporters of wooden building materials. The recent adoption of the CASBEE green building program provides an opportunity to increase exports of wooden building materials from the US to Japan, particularly those that improve energy efficiency. However, the results of this research suggest that Japanese builders remain reluctant to use the CASBEE program as they perceive that there is little market demand for environmentally friendly houses and even less desire on the part of homebuyers to pay a premium for them, particularly given the slow economy that prevails in Japan. In contrast, Japanese builders expressed much more optimism about two other programs that could increase the demand for US value-added wood products in Japan, the 200 Year House program and the Eco-Points program.

The results of the survey clearly show that Japanese building professionals perceive wood to be the most environmentally friendly structural building material across all six of the environmental performance measure included in the survey. In contrast, steel is perceived as being the least environmentally friendly structural building material across most of the environmental performance measures. Energy efficiency of the house was found to be the most importance environmental attribute and it was rated as being significantly more important than all of the other attributes. Using water saving appliances and fixtures was found to be the second most important environmental attribute. Based on the results of this research, it

appears that the various green building programs in Japan could provide new market opportunities for a variety of US value-added wooden building materials, including environmentally certified wood, energy efficient windows, water saving plumbing fixtures and insulation materials.

Finally, US government agencies and industry associations should be wary of the potential for CASBEE-Sumai to act as a non-tariff trade barrier by providing preferential treatment for domestic wood products. For example, the CASBEE program provides preferential points for domestic wood materials while both the national government and an increasing number of prefectural governments provide subsidies to home buyers and home builders for homes built using domestic wood. These Japanese programs undermine the environmental benefits of wood by promoting an agenda designed to increase the demand for domestic wood relative to imported wood. In doing so, they ignore the environmental superiority of wood relative to non-wood building materials as clearly demonstrated by a life cycle analysis. In effect, these programs promote a myopic strategy that pits domestic wood against imported wood in a fight for market share within a fixed market segment. In contrast, the goal of the wood industries in both countries should be to expand the demand for all wooden building materials by promoting their environmental superiority relative to steel and concrete; an approach which would effectively increase the total market for wood products to the benefit of both domestic and foreign suppliers of wooden building materials.

## **China**

With nearly twice the total floor space of the US and more than four times as much as Western Europe, China was expected to overtake Japan in 2009 to become the second largest construction market in the world. Yet green building in China's expanding building market is comparatively rare. The China Greentech Initiative, for example, estimates that certified green floor space constituted less than one percent of the new built environment in 2009. Recognizing the benefits of sustainable building, China's government has set ambitious targets and guidelines for green building, and developers, designers and builders are increasing their use of green materials and building principles.

Set against the backdrop of the global economic downturn, the Chinese housing sector has shown some encouraging signs of recovery. China's construction industry has grown at an average annual rate of 20% since 1990. Housing markets in major cities have recently started to pick up again thanks in part to the government's 4-trillion yuan stimulus package. According to China Data Center, investment in new construction between January and May 2009 reached over 2.5 trillion yuan, an increase of 43% compared to the same period last year.

Since 2006, the Chinese government has been working to promote its "4-savings and 1-environmental" housing ideology, which stands for: energy-saving, land-saving, water-saving, raw material-saving and less pollution. The Center for Housing Industrialization was founded in 1998. Since then, it has initiated several key national projects and drafted guidelines for improving productivity of construction and improving the "healthy" and "environmental" properties of residential buildings in urban areas. According to the 11th five-year plan initiated by the Ministry of Housing and Urban-Rural Development (previously, the Ministry of Construction), by the end of 2017 the level of industrialization of the Chinese housing sector will reach 30% from the current 7-8%, and the average service life of residences will increase from 50 to 100 years. China has started to develop 10 demonstration housing projects, 10 experimental cities, and 10 model construction enterprises. Currently, most construction in China is concrete and brick, while the market for wood frame construction has been growing very slowly due in large part to the government's tight restrictions on land use in urban areas. After the Sichuan earthquake last May, the Canadian Wood Association participated in the region's reconstruction projects and donated \$8 million to help build wood frame houses for local residents. This has been reported widely in China and in turn has helped wood frame house win wider market recognition.

The new green building program in China, the Three Star System, has the potential to increase the demand for wooden building materials (both primary and secondary wood products) used in residential construction. The extent of its impact on demand in China will be influenced by the degree to which it is accepted and utilized by developers, builders, architects and home buyers. However, the Chinese green building program makes no specific mention of wood as a material of choice, suggesting that the US

government and industry groups need to continue working with the Chinese government to encourage the use of life cycle analysis as the basis for future revisions to the green building program.

Despite this shortcoming of the Chinese Green Building Program, green building materials (particularly those related to energy-saving) will be increasingly in demand in China, led by public/commercial buildings and high-end residential projects in major cities such as Beijing, Shanghai and Guangzhou. These opportunities include energy efficient wood windows for high end apartments and condominiums. In particular, wood windows with either vinyl or fiberglass cladding on the exterior have strong potential because of their lower maintenance requirements. Other value-added wood products with strong market potential in China include cellulose insulation, environmentally certified wood, and high quality wood cabinets and flooring produced from certified wood targeted towards high-end apartments, condominiums and detached homes.

In China, almost 95% of respondents have heard of the green building program, a third planned to use the program and just over ten percent have used the green building program. Chinese builders report that the most important material attribute is using energy efficient products and materials, followed closely by using renewable materials. Both of these observations suggest that opportunities exist to market energy efficient wood products (e.g., wood windows and cellulose insulation) for use in multi-story, multi-family condominium and apartment buildings. The survey results obtained for the relative environmental performance of wood, concrete and steel clearly show that Chinese construction professionals perceive that wood and wooden structures provide superior environmental performance across a variety of environmental measures spanning the life cycle of a material. This trend is similar to the trend observed in Japan.

Finally, it should be noted that the US, Japan and the EU have all passed legislation requiring that importers of wooden products must be able to demonstrate that these products do not contain illegally harvested wood materials. As a result, we can expect to see the demand for certified wood in China continue to increase, particularly if the Russian government carries through on its intention of increasing its log export tax to 80% in January 2012.

Wood frame houses have increasingly been accepted into the Chinese market. In February 2009, the Shanghai government approved a B.C.-designed roofing system as part of a plan to renovate 10,000 city apartment buildings in the lead-up to the World Expo 2010 in Shanghai. As China moves to develop more and more “green” houses, experts predict that timber structures will continue to gain recognition by the government and construction sectors in China and open up new opportunities for green building materials and engineered wood products. Also, the projects being promoted by the Canadian Wood Association in Sichuan suggest that wood frame houses could be successful in the rural areas of China where land use is less regulated by local governments.

### **Strategic Recommendations**

A number of programs (including green building programs) focused on improving the environmental performance and energy efficiency of homes have been adopted in China and Japan. At the same time, builders, architects and design professionals in both countries perceive wood to be the most environmentally friendly building material. They also believe that homes built from wood are more energy efficient than homes built from steel or concrete. These trends set the stage for promoting wood as a superior building technology as well as for promoting the superior environmental performance of value-added wood building materials such as wood windows and doors. For example, the Eco-Points program in Japan provides a unique opportunity to promote energy efficient US wood windows in both new home construction as well as the growing repair and remodel sector of the housing market (although wood windows must still gain approval under the Japanese fire code to be used within urban fire and quasi-fire zones).

The results of this research project clearly show that there are a variety of market opportunities for expanding US exports of value-added wooden building materials into both Japan and China. Perhaps the best market opportunity exists for increasing exports of wood windows given the emphasis in both countries on increasing the energy efficiency of new buildings. This will be easier to accomplish in China

than in Japan where restrictive fire codes require the certification of wood windows used in fire and quasi-fire zones. In addition, the green building programs in Japan and China provide a good market opportunity to expand exports of cellulosic insulation, structural insulated panels, environmentally certified wood and value-added wood products used in interior applications that are made from certified wood (e.g., wood cabinets and flooring). Finally, good opportunities exist to increase exports of certified structural wood products such as glue-laminated beams, metric sized lumber, dimension lumber and treated lumber using the new generation of less toxic wood preservatives.

In order to increase the exposure of US value-added wood products among building professionals in Japan and China, US exporters should strongly consider participating in the wide variety of trade shows and trade missions by joining industry associations that are active in international markets and have a proven track record of providing access to qualified buyers in these countries. For example, the Evergreen Building Products Association offers trade missions to Japan and China several times a year. Similarly, the State of Washington sponsors trade missions for wood products manufacturers in Japan. Finally, industry associations such as the Softwood Export Council and the American Hardwood Export Council provide opportunities for US companies to rent booth space within the US Pavilion at trade shows in Japan and China. All of these associations provide tremendous logistical support for US exporters and manufacturers of wood building materials, allowing them to focus their energy on meeting potential customers for their products (a list of upcoming trade shows and missions is included in Appendix D).

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