

## Structural Changes in the Global Forest Sector in the 21st Century

By John Perez-Garcia

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The last decade of the 20<sup>th</sup> century produced significant structural changes in the global forest sector. The demise of the Soviet Union had a large impact on global production and consumption of wood products. Efforts to sustainably produce timber in tropical forests and environmental restrictions on timber harvests significantly constrained timber supply. In addition, housing in the US saw an unusually long cyclical upswing while Asian economies faltered, especially Japan's. These structural and cyclical changes are carrying forward into the new century, but can they be sustained over the next decade and if so, how will the global forest sector fare?

A quick look at how the global forest sector utilizes wood as an industrial raw material permits us to deduce where the forest sector will be in the future. Industrial raw material is defined as timber that produces paper and paperboard products, solid wood products and other miscellaneous products, (i.e. no firewood). To project where the forest sector will be in the near future we examine the historical relationship between consumption of industrial round wood and economic activity. This relationship postulates that as global income increases so does the consumption of wood raw materials.

Figure 1 charts such a relationship using world gross domestic product (GDP), as the measure of global income converted to real US dollars using purchasing power parity, and consumption of round wood in million cubic meters. The structural changes alluded to above are evident as the line representing the long-term relationship between consumption and income drops in the early 1990. The effects of the collapse of the Soviet Union and other factors obviously resulted in a sharp decline in global consumption of industrial round wood. The changes in the former Soviet Union, which are to a certain extent responsible for the decline of over 200 million cubic meters, also partially caused the rate at which wood as a raw material is utilized in economic activity to adjust.

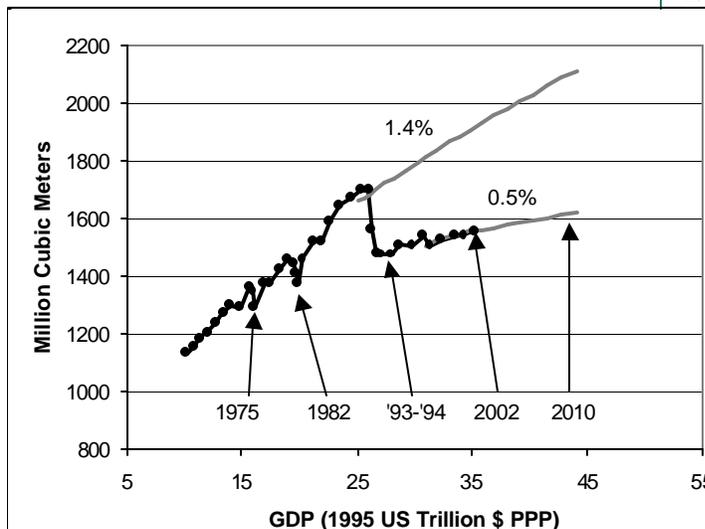


Figure 1. Consumption of industrial round wood by economic activity from 1965 with preliminary estimates for 2000 to 2002 and projections to 2010.

Sources: FAO, World Bank, OEC; Projections: CINTRAFOR

Another important factor in this large decline in global consumption is the lack of wood available for industrial use. By 1993, the effect of timber supply restrictions due to stricter environmental regulations and the push for sustainable harvest levels contributed significantly to the sharp decline in consumption. These factors were unforeseen by the global forest sector. We will examine these factors in more detail below, but first we discuss the structural change in global consumption introduced above and brought about by the reform of the Soviet Union.

In addition to the structural change, there are cyclical movements of consumption associated with the global business cycle. There have been several dips in consumption as evident in Figure 1. The first two dips are a response from wood using industries to higher energy costs, which led to worldwide recessions in 1975 and 1982. A global slowdown in 1991 is also a factor in the decline in consumption, yet these cyclical events tend to average out over time. For example, prior to 1990,

# Director's Notes:

by Paul Boardman

## CINTRAFOR'S Contribution:

### CINTRAFOR

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The Center for International Trade in Forest Products addresses opportunities and problems related to the international trade of wood and fiber products. Emphasizing forest economics and policy impacts, international marketing, technology developments, and value-added forest products, CINTRAFOR's work results in a variety of publications, professional gatherings, and consultations with public policymakers, industry representatives, and community members. Located in the Pacific Northwest, CINTRAFOR is administered through the College of Forest Resources at the University of Washington under the guidance of an Executive Board representing both large and small companies, agencies, and academics. It is supported by state, federal, and private grants. The Center's interdisciplinary research is carried out by university faculty and graduate students, internal staff, and through cooperative arrangements with professional groups and individuals.

CINTRAFOR News Editor:  
Jane Edelson

It has been just one year since I joined CINTRAFOR. In those twelve months CINTRAFOR has accomplished much. Although our Center is decidedly national in scope, providing services to national policy makers and industry leaders, I want to highlight the contributions to the State of Washington in this *Director's Notes*. The benefit of CINTRAFOR to the State of Washington is large.

#### Benefit to the State of Washington:

- *One-of-a-kind applied research center in forest products within the state.* There is no other institution in the country like CINTRAFOR that researches overseas markets for forest products and disseminates that information to the public and to companies in the region and around the world. The closest institution to CINTRAFOR is our "sister" center IMPACT, within the Washington State University, which researches international markets for agricultural and food products. The fact that these two centers are within the State of Washington is a tremendous benefit. The federal government accords these two centers great importance, represented in the combined federal grant dollars to the centers of over \$800,000. Though CINTRAFOR's work reaches a broader audience than the State of Washington, the benefit to the State is large.
- *Immense leverage of resources.* For every \$1 dollar the state gives to CINTRAFOR the State receives \$8 in return via federal, industry and other funds. There is tremendous leveraging of the State's resources to get information into the hands of companies and individuals who need it.
- *National programs with direct economic development benefit to the State.* CINTRAFOR spawned several national programs that bring direct economic benefit to the state; especially to rural communities. The Rural Technology Initiative was incubated within CINTRAFOR, the Landscape Management System was developed in partnership with CINTRAFOR, and the Consortium on Research on Renewable Industrial Materials (CORRIM) is still operating within CINTRAFOR, under the able leadership of Bruce Lippke.
- *Graduate level training for forest product professionals.* The superior training and education for forest products professionals that CINTRAFOR provides benefits the State of Washington. Every year state monies support graduate students who conduct research on projects that are prioritized by the CINTRAFOR Board of Advisors and the State of Washington.
- *Market research and information for small to medium sized value-added forest products companies.* CINTRAFOR adds to the competitiveness of the state by providing applied research and information on foreign markets and economic impacts that small to medium sized companies could not otherwise afford. There is no other center or organization in operation that could do the in-depth analysis of, for example, the wood window and door market in the post and beam sector, or a comprehensive assessment of the Japanese wood products and forestry industries.
- *Information for state policy and decision makers.* CINTRAFOR researches and provides information for policy makers on issues that are urgently important for Washington State. For example, information regarding the economic impact of forest and fish regulations on small businesses and rural communities has been in high demand from the DNR and other policy makers within the state.
- *Direct practical activities that benefit value-added wood products companies, keeping jobs in the state.* Our on-line database for small to medium sized value added wood companies will feature over 600 State of WA companies and will be searchable in numerous categories. This will be on the CINTRAFOR website in August and will be fine-tuned through the rest of this year.
- *Clearinghouse for information on forest products export statistics.* From the vast information available on our web-site to our efficiently managed in-house forest products export library, Washington companies and policy makers can access export statistics and specific market information on everything from who their competitors are to how much wood is being substituted by other materials. Please see some of our reports for more information.

CINTRAFOR contributes much to the State of Washington.

## CINTRAFOR'S STUDENTS

CINTRAFOR welcomes four new students in the Fall. Two students, Karen Brown and John Garth will work on an M.S. in forest products marketing. Alicia Robbins will be working on an M.S. in forest economics jointly with the Jackson School, and Jean Daniels will be working on a Ph.D. in forest economics.

CINTRAFOR congratulates Jun Fukuda for graduating this summer with a Masters Degree in Forest Products Marketing. He is now working for the Ministry of Agriculture, Forestry and Fisheries; Forestry Agency, International Trade Division in Japan.



the forest products industry was increasing its use of wood by 1.4% annually with an average 3% rate of growth in the world economy. An extension of this utilization rate would have placed global consumption at around 2.1 billion cubic meters by the year 2010, were it not mostly for the structural change associated with the collapse of the former Soviet Union, along with some other factors. The forecast is illustrated in Figure 1.

The collapse of the Soviet Union and environmental restrictions enacted in the early 1990s disrupted this average growth rate. Data for the last decade suggest that, on average, the forest products industry worldwide was increasing its use of wood as a raw material at an annual rate of 0.5%, a sharp decrease compared to its consumption rate observed during the previous three decades. A projection of industrial use suggests that global consumption will be approximately 1.6 billion cubic meters by 2010, a level observed in the mid 1980s. The forecast is also illustrated in Figure 1.

The events in the former Soviet Union have had global implications for the forest sector. To understand the nature of wood utilization by the global forest sector outside of Russia's contribution, Figure 2 illustrates the relationship between wood use and economic activity excluding the former Soviet Union and what is currently Russia. The rate at which industry was utilizing wood as a raw material was growing at a similar 1.4%, even when Russia's contribution past and present are removed from the data.

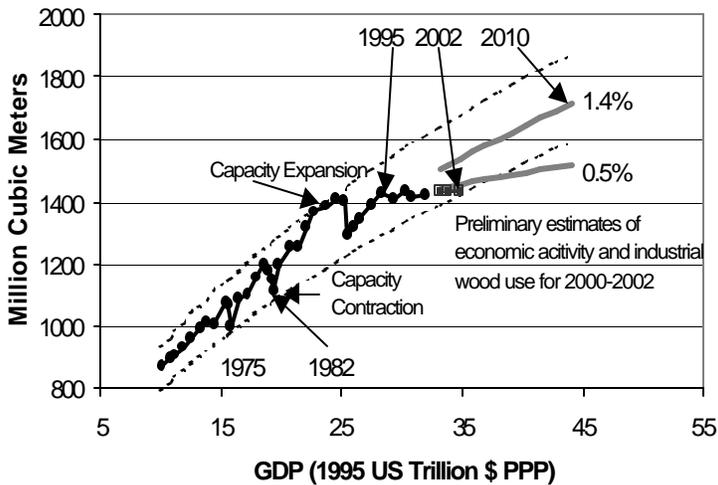


Figure 2. Consumption of industrial round wood excluding Russia by economic activity from 1965 with preliminary estimates for 2000 to 2002 and projections to 2010.

Sources: FAO, World Bank, OECD; Projections:

Figure 2 illustrates how consumption declined sharply from 1990 to 1991. This is due to the restrictions on timber supply in temperate and tropical regions. Combined with a global slow-down, consumption of industrial round wood decreased over 100 million cubic meters, the largest decline in a single year. Economic recovery placed consumption on track to continue its historical 1.4% per year increase. However, during the later half of the 1990s and early 2000s, consumption has remained flat, as preliminary estimates of world-

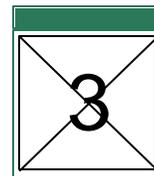
wide economic activity and consumption of industrial round wood suggest. The consumption trend is even below the 0.5% per year growth rate alluded to above. Some of the below average growth can be associated with the cyclical factor of low Asian economic growth, yet the trend suggests some additional points.

The way in which industry uses wood has changed due to the limited availability of wood, and its subsequent price increase in the 1990s. This change may be a permanent one, only time will tell. In particular, the 1990s saw sales of engineered wood products increase as industrial users sought products that use wood more efficiently to use and reduce consumption of industrial round wood.

Figure 2 also includes two dashed lines that encompass the data for consumption of industrial round wood and economic activity. One may view these lower and upper curves as reflecting consumption levels where capacity adjustments take place. For example, when faced with several years of above average consumption, plans for capacity expansion are initiated. Most notably, during the later half of the 1980s we see actual consumption defining the level at which capacity may expand. Likewise, during periods of declining consumption, capacity retirement takes place. When capacity utilization is below average it forces plants to close, and at continued low levels of activity, manufacturing capacity shuts down permanently. Worldwide recessions in 1975 and 1982 define these points of capacity contraction.

Preliminary estimates of global consumption shown in Figure 2 suggest an interesting point regarding global manufacturing capacity. If we assume that the rest of the world, less Russia, continues to use wood at the 1.4% rate, the global industry is clearly at a point in which excess industrial capacity exists since preliminary estimates of global wood consumption for 2000 through 2002 lie near the capacity contraction curve. Should we assume that the use of wood as an industrial raw material grows at the 0.5% rate due to structural changes alluded to above we still expect the global industrial sector to have surplus processing capacity. The fate of this surplus capacity depends on the recovery and utilization rates by the industry.

What makes predicting where the global forest sector is likely to be in the near term difficult is the cyclical factor of depressed Asian economic activity, particularly Japan. Even at the 0.5% annual growth rate, the preliminary estimates of economic activity and industrial wood use suggest that consumption is below trend, and this may be a reflection of low economic activity in Asia. Should the underpinnings of the relationship depicted in Figures 1 and 2 be correct, we would expect that in the short term, industrial use of wood should increase to a level suggested by the average growth rate, putting into use some of the surplus capacity alluded to above. But by how much depends on the assumption of where the growth rate for industrial wood use lies. ☒



# The Taiwan Market for Wood Frame Construction and Wooden Building Materials

By Rose Braden

With the help of foreign investment in the 1960s, and deregulation of Taiwan's financial sectors in the 1980s, Taiwan has emerged from its agrarian roots to become one of Asia's leading producers of high-value goods. It is now one of the wealthiest of Asian countries and the 17<sup>th</sup> largest economy in the world. Gross national product has increased 72% or almost \$110,000 million from 1989 to 1999. Per capita income also increased 58% since 1989 and the rate of personal savings is among the highest in the world.

Now that Taiwan's citizens have achieved a high level of affluence the government is turning its attention to promoting leisure time, domestic tourism, and aesthetics. As part of this emphasis on aesthetics, the use of softwood building materials in urban areas and tourist areas is increasing rapidly. The Taiwan government is replacing concrete structures at city parks with wooden gazebos and benches made of treated southern yellow pine. In rural areas the government is building more walkways and viewing platforms, government administrative offices, and public buildings of solid lumber, logs, and glue-laminated (glulam) beams. Private companies are also building communities of wood frame cabins and log frame resorts in tourist areas. Cabins made of structural insulated panels have been particularly well received. Interest in using glulam beams in large public buildings is also growing. There are only two large glulam buildings in Taiwan at this point but there are plans to begin building a 40-meter bridge in October 2001 and other buildings are being considered. While the wood frame housing market will likely always remain a niche market in Taiwan, it can be considered a way to diversify Pacific Rim sales of high-quality lumber and minimize some market fluctuation.

## Current Imports

Although trade statistics do not track imports by grade, the Taiwan Lumber Association estimates that over half of the lower grade SPF that Taiwan imports is used for pallets and packaging. The Taiwan Lumber Association also estimates that in 1999, the pallet sector consumed approximately 150,000 m<sup>3</sup> of lumber.

While the majority of Taiwan's wood imports are low-grade material, increased interest in wood frame recreation facilities should stimulate the demand for higher-grade logs and lumber. For example, total imports of US logs declined in 1998, yet by 2000 they returned to 1996 volumes. These data also illustrate the popularity of naturally decay resistant species, such as western red cedar, used in outdoor applications. Small diameter logs are used for log homes and larger logs are remanufactured.

According to Enhanced Forestry, a Taipei company, that imports approximately 90% of Taiwan's red cedar logs, most of these logs are harvested in Alaska.



## Government Projects

### Facilitate Wood Frame Construction

Particularly important to the adoption of wood frame construction is the Taiwan government's strong support of wood as a structural building material. Wood as a structural material is viewed particularly as a means to provide more earthquake resistant housing — a concern that has become more salient since the 1999 earthquake that killed more than 2,200 and left over 100,000 homeless. The earthquake was particularly devastating in the semi-rural areas of Taichung and Nantou, where it damaged 115,000 housing units, completely destroyed approximately 60,000 units and rendered an additional 8,000 uninhabitable. In an effort to improve the quality of wood frame construction and the ease of getting projects started, the Ministry of Interior's Architecture Building Research Institute (ABRI) is receiving approval from the Construction Planning Administration (CPA) to review and revise the building codes.

While the building codes do not restrict the use of wood in private homes if they are under 14 meters or 4 stories high, (with the exception that wooden roof components must be covered) the codes are prescriptive and do not outline detailed engineering requirements to ensure structural soundness or proper treatment of building materials to retard fire and insects. However, wood used as a structural material in public-use and multi-family buildings is considered a "special material" and requires a special building permit that can take up to two years to obtain. This is considered a major barrier to the growth of the wood frame construction industry since there appears to be more immediate potential for large public buildings constructed of wood. Fire codes also restrict the use of wood as exposed trusses and beams in roof construction. However, exposed beams and trusses are a major draw for designers to use wood in public and private buildings.

The revised codes will not only recognize wood as a "standard" building material, eliminating the lengthy review process to obtain a permit to build public or multi-family buildings of wood, they will include detailed requirements for structural aspects such as proper engineering principles, materials, and treating requirements for 2x4 and post and beam construction. The ABRI is looking at North American and Japanese building codes to adapt to their own codes for wood frame construction. The ABRI plans to begin reviewing the codes by the end of 2001 and expects to complete the revisions by the end of 2002.

In another effort to promote wood frame construction in Taiwan, the CPA, with US\$3.5 million from the Taiwan government, also plans to include wood frame multi-story wood frame apartments,

*continued on page 6*

# CINTRAFOR'S International Forest Products Markets and Asian Housing Export Conferences

The Center for International Trade in Forest Products at the University of Washington is holding its 18th annual International Forest Products Markets conference in conjunction with the 3rd Asian Housing Export Markets conference on September 24-26, 2001 at the Sea-Tac Marriott in Seattle, Washington. The International Forest Products Markets conference will include market outlooks for timber, logs, chips, and other forest products, as well as a number of special topics. The Asian Housing Export Markets conference will include overviews of leading destinations for wood frame housing and building materials, advice about doing business in these markets, information about picking joint venture partners, and successful export strategies of leading suppliers. The Asian Housing Export Markets conference will also feature representatives from the US Embassies in Japan, China, Korea, and Taiwan who will give detailed economic and political overviews of their respective countries. These presentations should be of interest to attendees interested in trade with these countries as well as those interested in gaining a more in-depth understanding of Pacific Rim economics and politics.

Presenters from all over the world have been invited to discuss critical topics such as:

- ❖ Status and Outlook for Leading Asian Consuming Countries
  - Japan, China, Korea & Taiwan : What are the opportunities and how do you access the markets?
  - Latin America: How will the increase in Latin America's presence in the international market affect US suppliers in domestic and export markets?
- ❖ Changes in Japan's Regulatory Environment and how they Affect Primary & Processed Wood Imports
- ❖ Financial Trends in the Forest Products Sector
- ❖ Successful Export Strategies: How did suppliers increase their share of the Japanese lumber market and what are other successful exporters doing to increase sales?
- ❖ Certification of Forest Products from the Point of View of a Major Timber Supplier
- ❖ Engineered Wood Products Progress Update
- ❖ Picking Reliable Joint-Venture Partners and Reducing Risk in Overseas Business

Please see the following site for conference agendas, registration information, and a registration form:  
<http://www.cfr.washington.edu/outreach/ifpm/ifpmConference.htm>

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## CINTRAFOR INDEX

- Japan imports of laminated lumber in 2000 will increase 46.4% to 520,000 cubic meters. (AF&PA Jan/Feb 2001 International Wood News)
- China's total solid wood imports increased by 50% in 1999 to \$2.9 billion, making it the second largest Asian importer after Japan. (FAS Sept 2000)
- American forests currently produce more than 80 million cubic meters (2.8 billion cubic feet) of sawn timber each year - the largest woodbasket in the world. About 10% of this timber is exported overseas. (SEC N.Europe market report Oct-Dec 2000)
- China's production of industrial roundwood jumped from 101 million m<sup>3</sup>, 7% of the world's total in 1998, to 207 million m<sup>3</sup>, 13% of the world's total in 1999. (FAO)
- World trade in wood goods is estimated to amount to over US \$100 billion per year. (FIM; [www.fimltd.co.uk/timber.htm](http://www.fimltd.co.uk/timber.htm))
- The Ministry of Posts and Telecommunications estimates that by 2005 the number of internet users in Japan will double to 87.2 million and the value of e-commerce activity will increase from \$400 billion US to \$1.1 trillion US. (TT extract, from Yahoo June 14, 2001)
- Over 10 million cubic meters of logs were imported into China in 1999. (Jones Stevedoring Co., May 11, 2000)
- Sixty-seven percent of Japan's land use is forest and woodland as compared to U.S. which is 29%. (CIA handbook)



*"Taiwan" continued from page 4*

townhouses, attached single-story senior housing, and single-family homes for low and moderate-income families in its Nantou redevelopment project. Half of the buildings in the redevelopment project are planned to be 2-3 story wood frame apartments and townhouses. The wood frame projects will be exempt from the permit process and wood will not be considered a "special material" because the CPA is overseeing the project. If the public responds favorably to the model homes the CPA plans to build more. The Canadian government has already committed to build sample modular homes in the development starting in August-September 2001. The CPA has allocated US\$56/ft<sup>2</sup> (NT60k/ping) for land and US\$37/ft<sup>2</sup> (NT40k/ping) for the completed home. The inclusion of wood frame housing in the CPA's Nantou development is beneficial to the wood frame construction industry since it will provide examples of wood frame construction in Taiwan and show the public that the CPA endorses wood frame construction as an earthquake resistant form of housing.

Under the Agriculture Development Act, the CPA is also rezoning 150,000-200,000 acres of agricultural land surrounding Nantou to multiple use in increments of approximately 15,000 acres per year. Medium density areas such as Nantou and Taichung counties are considered ideal for single and multi-family wood frame housing and the newly available land is considered vital to the growth of the wood frame construction industry.

#### **Education Needed to Overcome Consumer Concerns and Architect Inexperience**

Despite the government's support for wood frame construction, there are still many obstacles to the widespread use of wood as a structural building material in Taiwan. Foremost of these obstacles is widespread consumer and architect concern about the susceptibility of wood buildings to fire, termites, and water and typhoon damage, and limited technical knowledge about how to design and build wood structures. Other obstacles include cost, difficulty obtaining financing and insurance, and limited space in urban areas for single-family homes. Since there are very few examples of wood frame construction in Taiwan, most consumers do not understand what a wood frame house is, often picturing a log home instead. These misconceptions indicate a need for US industry to educate Taiwanese architects, builders, and consumers that wood frame construction is durable, resistant to the elements if constructed properly, and more comfortable than concrete housing.

Even in cases where wood is used as a structural material, builders, architects and manufacturers have limited understanding about the physical differences between species, often purchasing species with lower strength ratings in favor of lower price. There is only limited information available in Taiwan about US species, the advantages of using these species, and wooden building materials and wood frame construction in general that is written in Traditional Chinese, Taiwan's native language. It is also important to produce technical literature in Traditional Chinese since the ABRI will be referring to technical information from a variety of countries as it revises the building codes.



Respondents raised the point that officials will be most likely to refer to the material that they can easily understand.

Another significant obstacle is cost. According to several builders, the average cost for a concrete or brick structure is US\$31/ft<sup>2</sup> (400,000 NT/ping) and the average cost of a wood frame structure is US\$56/ft<sup>2</sup>. Even if a consumer decides that he wants to buy a wood frame home obtaining financing and insurance is very difficult. While the availability of financing is vital to ensure the success of wood frame construction in Taiwan, banks are less willing to finance wood frame projects than steel or concrete projects. Some companies said banks will lend up to US\$244 (8,000NT) per square meter for steel or concrete construction, yet only US\$61 (2,000NT) per square meter for wood frame construction. Other firms said that since wood products have not passed Chinese National Standards fire tests, banks will finance only 40-50% of the value of wood frame projects, yet they finance up to 90% of concrete projects. In addition, to obtain financing the developer must obtain insurance, and insurance companies are very reluctant to insure wood projects.

#### **Recommendations**

There are three recommendations for the US industry to increase sales of high-quality lumber and building products to Taiwan. First, a relationship has already been established between the Agricultural Trade Office (ATO) in Taipei and ABRI. The US forest products industry should work with the ATO to strengthen this relationship and provide ABRI with US building codes, technical information about proper design, construction, and maintenance of 2x4 structures written in Traditional Chinese. A precedent has been set by Canada's Council of Forest Industries and Forintek when they signed a memorandum of agreement with ABRI to cooperatively work on revising the building code by providing technical evaluations and cooperating on testing wooden building materials for termites, fire, and humidity resistance. Second, it is paramount that the US forest products industry educate Taiwanese architects and builders about wooden building materials, US timber species, 2x4 technology, and about the advantages of wood frame homes, such as increased earthquake resistance and comfort, by producing and distributing brochures written in Traditional Chinese, and by holding seminars. It is also important to organize trade missions to bring Taiwanese architects, builders, and government officials to view projects in the US and meet with US firms. Third, to stimulate consumer demand for wood frame construction, the forest products industry should participate in trade shows and consider building a model home at the CPA's Nantou housing development. While the market for wood frame construction cannot fully take off until the building code recognizes wood as an accepted building material, the US industry should start developing interest at the consumer, **builder, and architect level now.**

*The full report, "Baseline Report on the Taiwan Market for Wood-Frame Construction and the Softwood Building Materials" will be available on CINTRAFOR's web site [www.cintrafor.org](http://www.cintrafor.org).*

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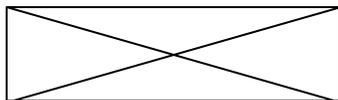
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