WOODBRIDGE
ASSOCIATES™

Wood-Cement Boards

Commercial Opportunities for Alberta Producers

BUSINESS CASE

Prepared for Alberta Finance and Enterprise (AFE)

April 2010

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1. What Are Wood-Cement Boards?

Wood cement boards, also known as wood wool cement boards ('WWCBs'), are an interior and exterior building material made from wood wool and cement (Charts 1 and 2).

The main characteristics of WWCB's are fire resistance, wet and dry rot resistance, freeze-thaw resistance, termite and vermin resistance and thermal insulation. Among the outstanding attributes of WWCBs are their acoustic performance and sound absorption, notably in non-residential applications such as swimming pools (Chart 3) and gymnasiums. The material accepts a wide range of finishes. In addition, a major application of WWCBs in developing countries is durable, energy efficient economic housing.

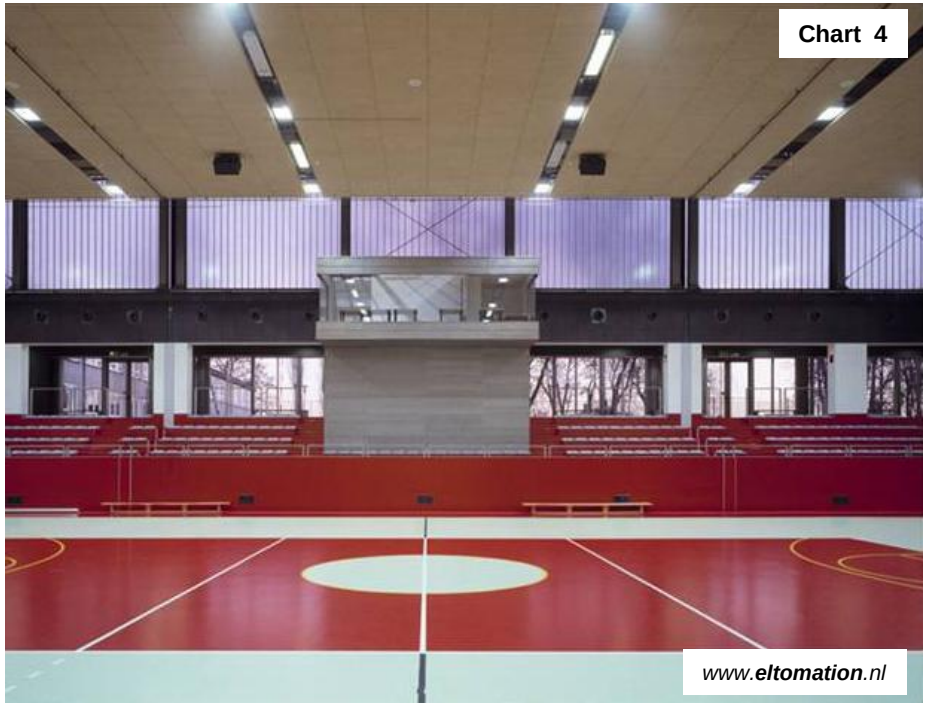
Chart 3


Chart 1


Chart 2

1. What Are Wood-Cement Boards? (continued)

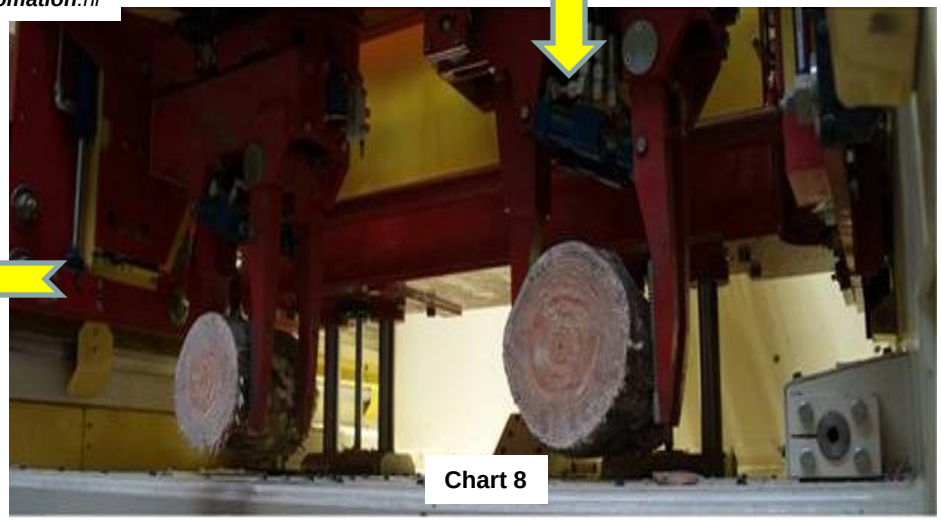
Eltomation, based in Holland, is a global leader in WWCB technology, R&D and manufacturing equipment. Eltomation has provided the following information with regard to WWCB properties. **Fire resistance:** WWCB has been tested and classified B1 (fire resistant) according to the German DIN 4102 standard. **Wet and dry rot resistance** Because the wood wool has been mineralized by the cement, moisture loses its effect on the board. The boards are used for interior and exterior applications and in moist conditions such as ceilings in indoor swimming pools. **Termite and vermin resistance** Tests have proven that WWCB is not vulnerable to attack by termites or vermin, nor is WWCB subject to any biological decay. **Thermal insulation** Because of its relatively low density, WWCB has good thermal properties. The maximum thermal conductivity for boards of 25 mm thickness is 0.090 W/mK. For 2- or 3-layer composite panels, the thermal conductivity will not exceed 0.040 W/mK, when a core of respectively rigid foam (e.g. polystyrene) or mineral fiber has been applied. **Acoustic performance** Unfinished (or spray-painted) WWCB has very good acoustic absorption properties since the open surface structure allows for a high level of sound absorption (Charts 4 and 5). **Finishes** Wood wool cement board accepts all kinds of conventional rendering, plastering, decorative materials and mastics. Acoustic ceilings can be spray- or roll-painted to retain the acoustic properties of the board. The following Wood wool cement boards are common: Standard WWCB; Composite WWCB (sandwich boards with a core sheet of Styrofoam, PU foam, Rockwool, or other insulating material). **Reinforced Roofing** WWCB Fine-fibre Acoustic and Decorative WWCB (source: courtesy of Eltomation)



2. How Are They Made?

The manufacturing process, involving shredding of the logs into a “wool”, and subsequent impregnation with cement, forming and drying, is fully integrated from logs to final product (Charts 6 to 9).

www.eltomation.nl



3. Why are they Being Considered as a Potential Investment in Alberta?

There are several reasons why WWCBs are being considered by AFE as a potential investment in Alberta. The principal reasons are:

- To date, WWCBs have been mainly a European development – although plants have been built globally (e.g. China, Russia, Latvia)
- Wood fibre is a large part of the total product – and wood costs are a major driver of its costs of production (i.e. a secure, low cost source of consistent diameter logs is essential)
- European supply of these logs is becoming more constrained (Chart 10) and expensive. Softwood lumber producers compete for the logs (Chart 11).
- Alberta is an excellent – and globally low cost – source of these logs. Alberta is well-positioned to become a large scale producer of WWCB's, aimed at North American markets. WWCBs have several 'green' product aspects and Alberta has an abundance of certified sustainably managed ('SFM') forests.

Chart 10

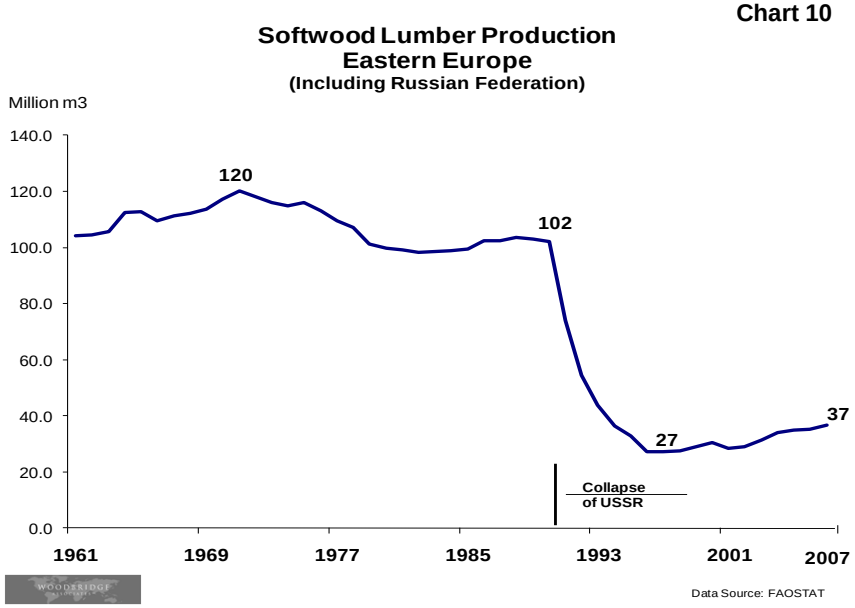
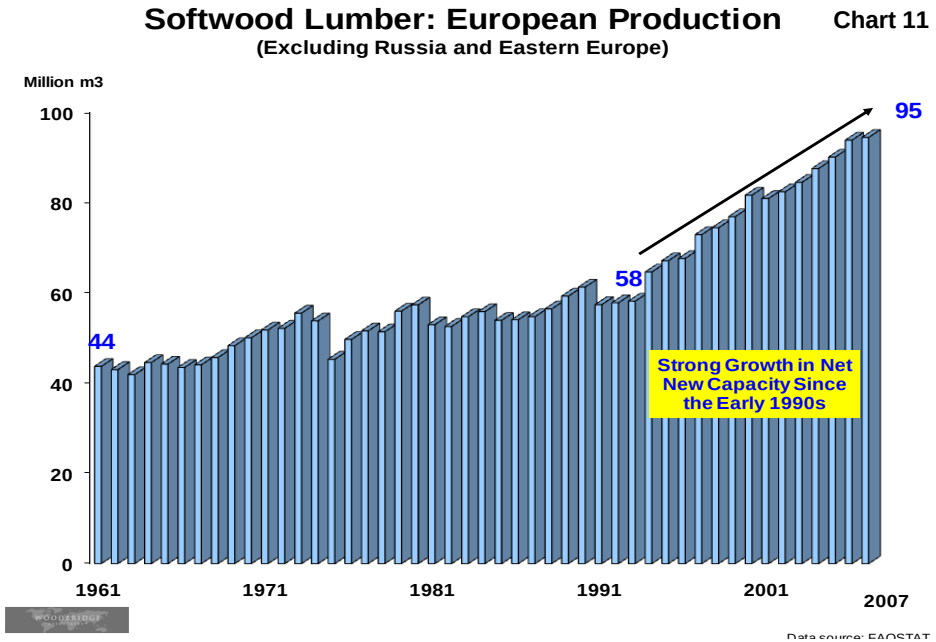


Chart 11



3. Why are they Being Considered as a Potential Investment in Alberta? (continued)

Green Building Product Market Growth

As one of the world's largest suppliers of SRM independently certified timber, Canada is well-positioned to expand as a supplier of WWCBs to green markets. According to the Canadian Sustainable Forestry Coalition, Canada ranks 1st among timber supply regions globally in its area of sustainable forests.

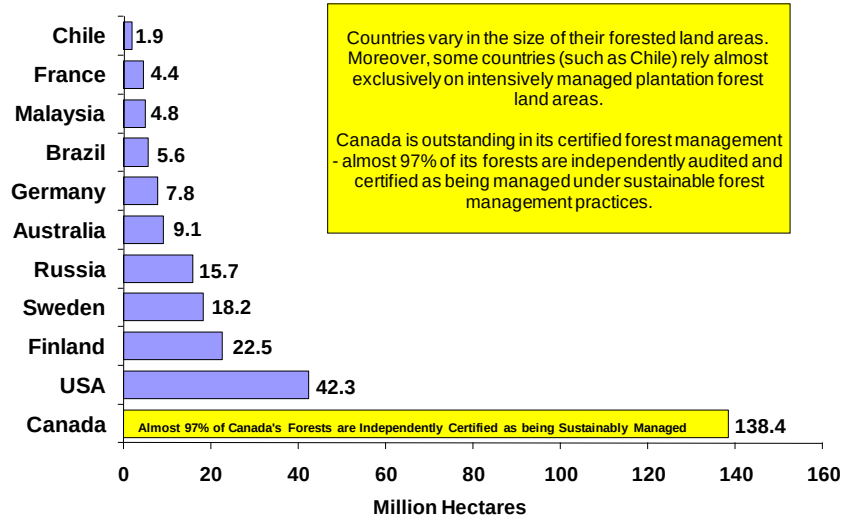
Chart 12 provides a global comparison, and shows that Canada far exceeds the United States in this regard. Moreover, with substantial softwood forests (Chart13) under long term tenures, producing a significant proportion of suitable sized logs for WWCB production (Chart 14), Alberta could be attractive to investors seeking continuity of long term supply and control over wood costs. It also has a well-developed log supply-chain (Chart 15).

Chart 15

Chart 13

Sustainable Forest Management ('SFM') Chart 12

Independent Third-Party Certification of Forests



Countries vary in the size of their forested land areas. Moreover, some countries (such as Chile) rely almost exclusively on intensively managed plantation forest land areas.

Canada is outstanding in its certified forest management - almost 97% of its forests are independently audited and certified as being managed under sustainable forest management practices.

Source: Canadian Sustainable Forestry Certification Coalition December 2007 (FPAC)

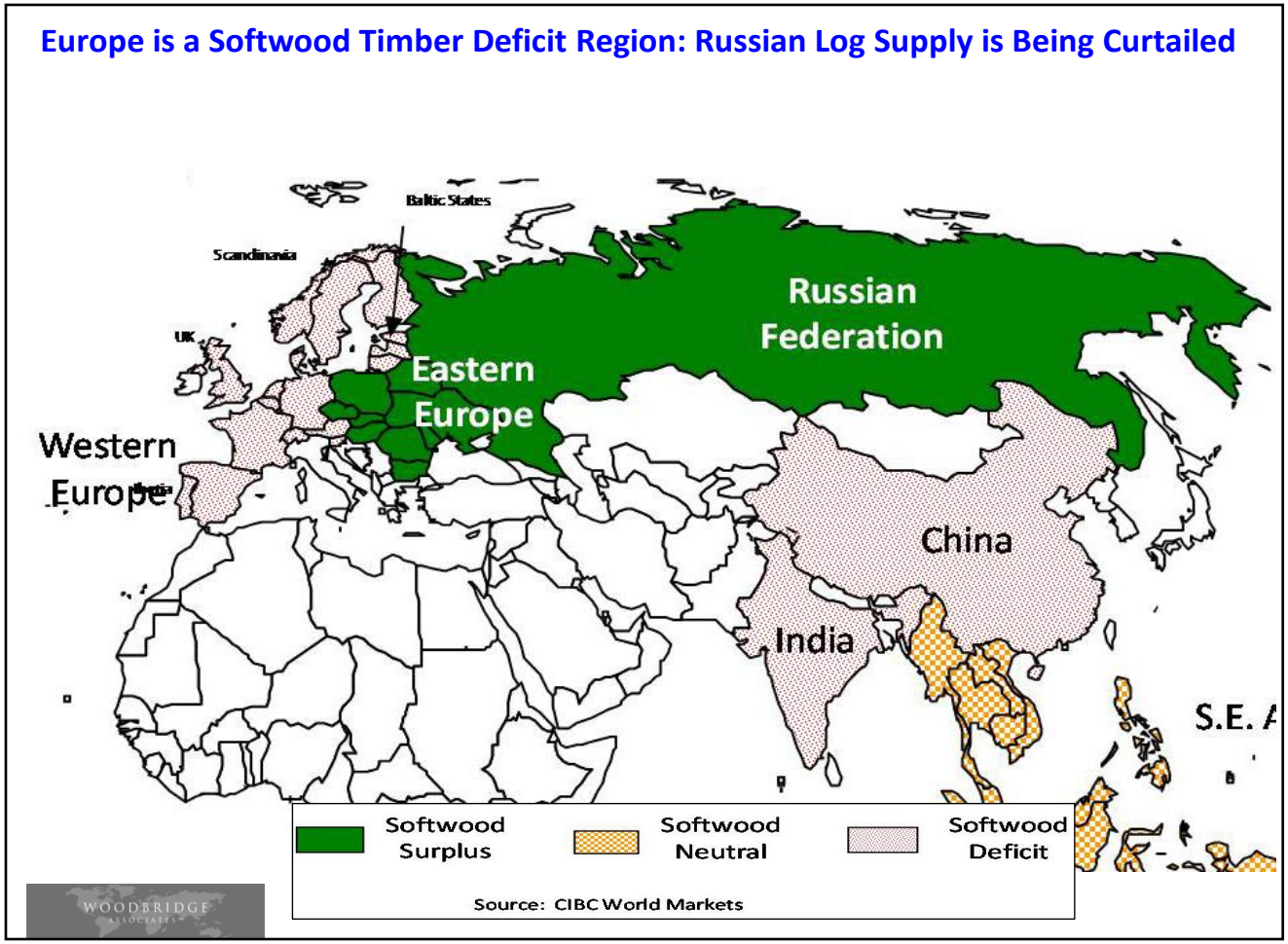
Chart 14

Good Quality Spruce Logs

3. Why are they Being Considered as a Potential Investment in Alberta? (continued)

As a mainly European technology at the present time, WWCB manufacturing in Europe faces several obstacles in secure timber supply and rising costs. In particular, a major strategic shift in regional timber supply has occurred in recent years with announced sharp reductions in log exports from Russia (Chart 16).

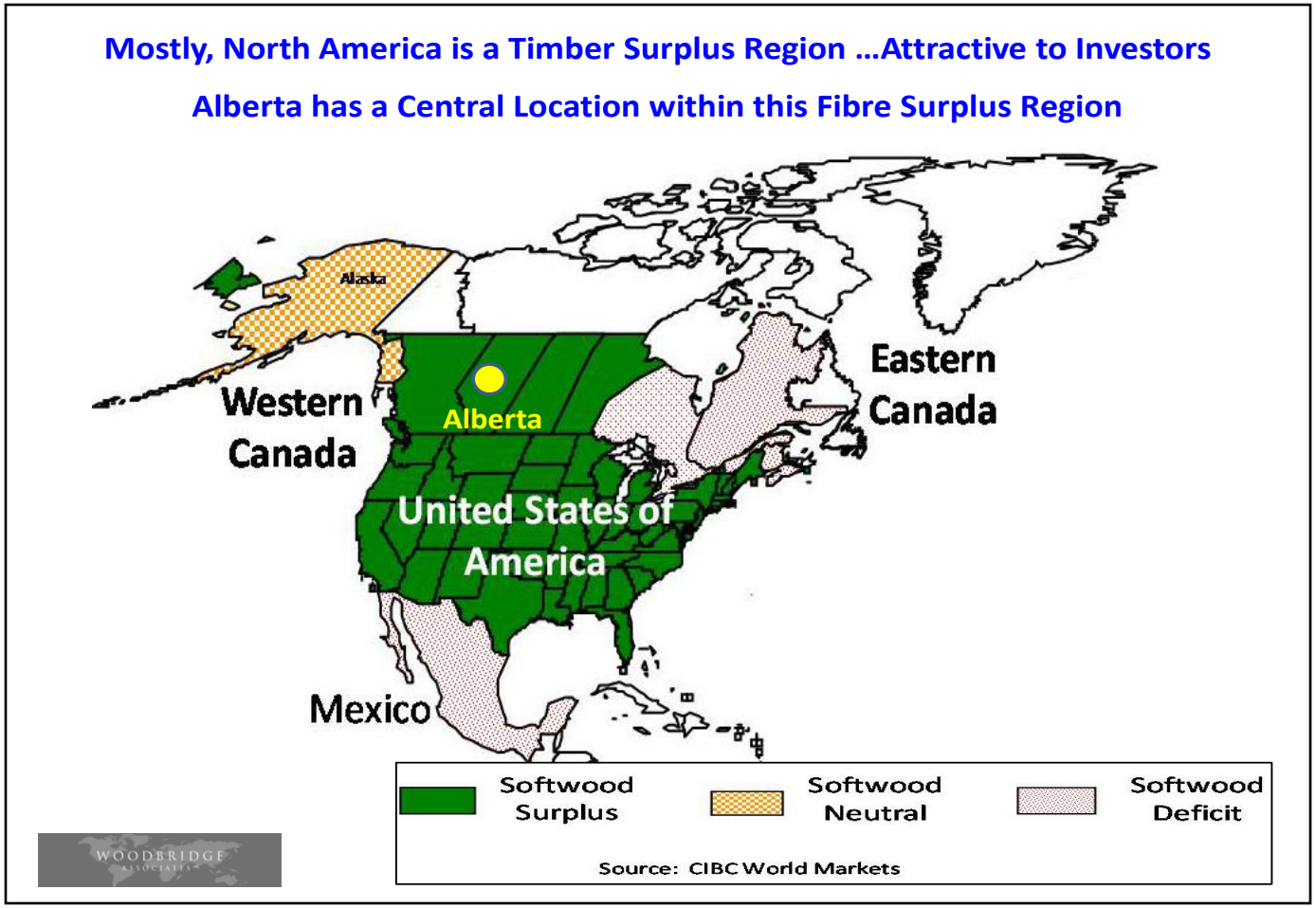
Chart 16



3. Why are they Being Considered as a Potential Investment in Alberta? (continued)

With rising constraints over timber supply in North America, including the pine-beetle epidemic in British Columbia and harvest volume challenges in Quebec, Alberta is one of the few remaining timber supply jurisdictions with a secure long term volume of Crown (i.e. public) timber harvest. In this respect, Alberta is an ideal location in relation to low cost and abundant supplies of suitable logs for WWCB production – and well placed for shipping final product to North American markets (Chart 17).

Chart 17



4. European Investors Should be Targeted for WWCB Investments in Alberta

Chart 18

GLOBAL TIMBER SUPPLY REDUCTIONS

= Fibre Supply 'Shock' with Global Impacts

Group A: Accelerated Mortality
- BC pine beetle epidemic
- Spruce budworm, other attacks
- Increased incidence of wildfires, globally

Group B: Policy Changes: Reductions in Public Timber Allowable Harvests
- Quebec harvest reductions (public forests)

Group C: Policy Changes: Allocation & Trade
- Russia log export tax
- Reductions in illegal logging (Russia, tropical regions)
- Widespread pressures to limit raw log exports – and process locally

Group D: Land Use: Withdrawals of Forestland from Commercial Development
- Ongoing environmental protection pressures, forestland set-asides
- Land use conflicts between food, fuel and fiber
- United Nations REDD program: *R*educe *E*missions from *D*eforestation and Forest *D*egradation:"
  - Tropical rainforest & developing countries
  - Private owners (First Nations/aboriginal peoples; and 'ethical funds')

As they already are familiar with WWCB technology, manufacturing and end-use markets, one of the presumptions of this business case is that European investors should be targeted for investment in Alberta.

In most cases, they already are familiar with the many timber supply constraints (Chart 18) emerging globally , and the focus of Alberta's promotional 'pitch' should use this as a foundation. In addition, it should be noted that numerous 'oversized' logs are produced in Alberta (Chart 19) which do not readily fit into the streamlined supply chain serving the sawmilling and plywood industries. Many local sawmills are seeking an alternative and better use for these oversized logs (Chart 20).

Chart 20

Numerous Oversized Logs are Produced in Alberta

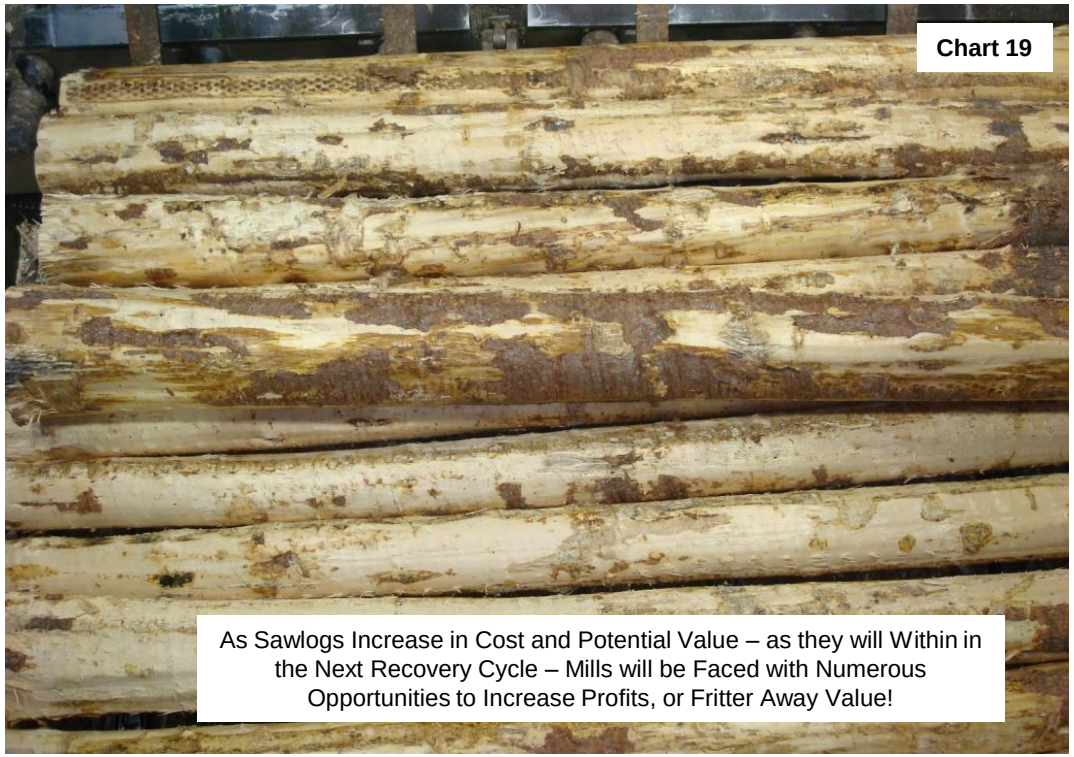


Chart 19

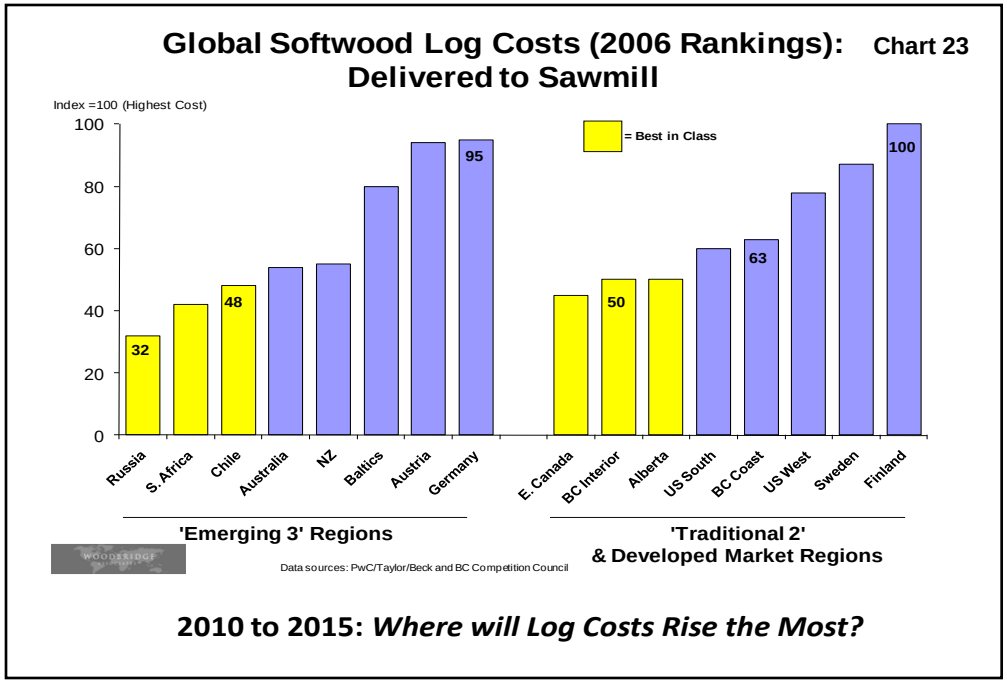
As Sawlogs Increase in Cost and Potential Value – as they will Within in the Next Recovery Cycle – Mills will be Faced with Numerous Opportunities to Increase Profits, or Fritter Away Value!

5. European Investment Already is being Attracted into Alberta's Bio-Fuel Industry

Bio-Fuels and Green Energy Sector

European investors already are aware of many of the related investment opportunities in the province. Alberta has been quick to act upon emerging opportunities in the production of bio-fuels. Importantly, there is still substantial scope for more of these activities – using wood biomass materials as well as, potentially, cellulosic materials from the regions' agricultural sector. WWCB production easily could be combined with related activities.

For example, wood pellet production (Chart 21) as well as fire-logs (Chart 22) using sawmill and other residuals help utilize the fibre available in the region and add additional elements of stability to the local forest economy. From a policy aspect in Alberta, this type of product and economic diversification is vital in a wide region, where exposure to primary wood products and pulp and paper demand cycles can cause wide fluctuations in forest products output and employment. Because of the limited size of the western Canadian market, the best sales prospects are in the USA. More importantly, from the potential investors' viewpoint, Alberta is highly cost competitive in softwood log costs (Chart 23)



6. Where are the Major North American Markets for WWCBs?

As noted earlier, most of the already established end uses for WWCBs currently are found in the non-residential sector. There is a potential, but most likely smaller, market in new residential housing and in home improvement. Importantly, from a residential 'green' building product perspective, WWCBs are easy to handle – lending themselves to installation either by professionals or by the homeowner. As is well known, construction spending in the U.S. has declined sharply since its peak of US$1.17 Trillion in 2006 (Chart >). Much of this was due to the collapse of the U.S. housing market. This is now stabilizing, and will recover – but at a slow pace for the next five years (Chart >).

Chart >

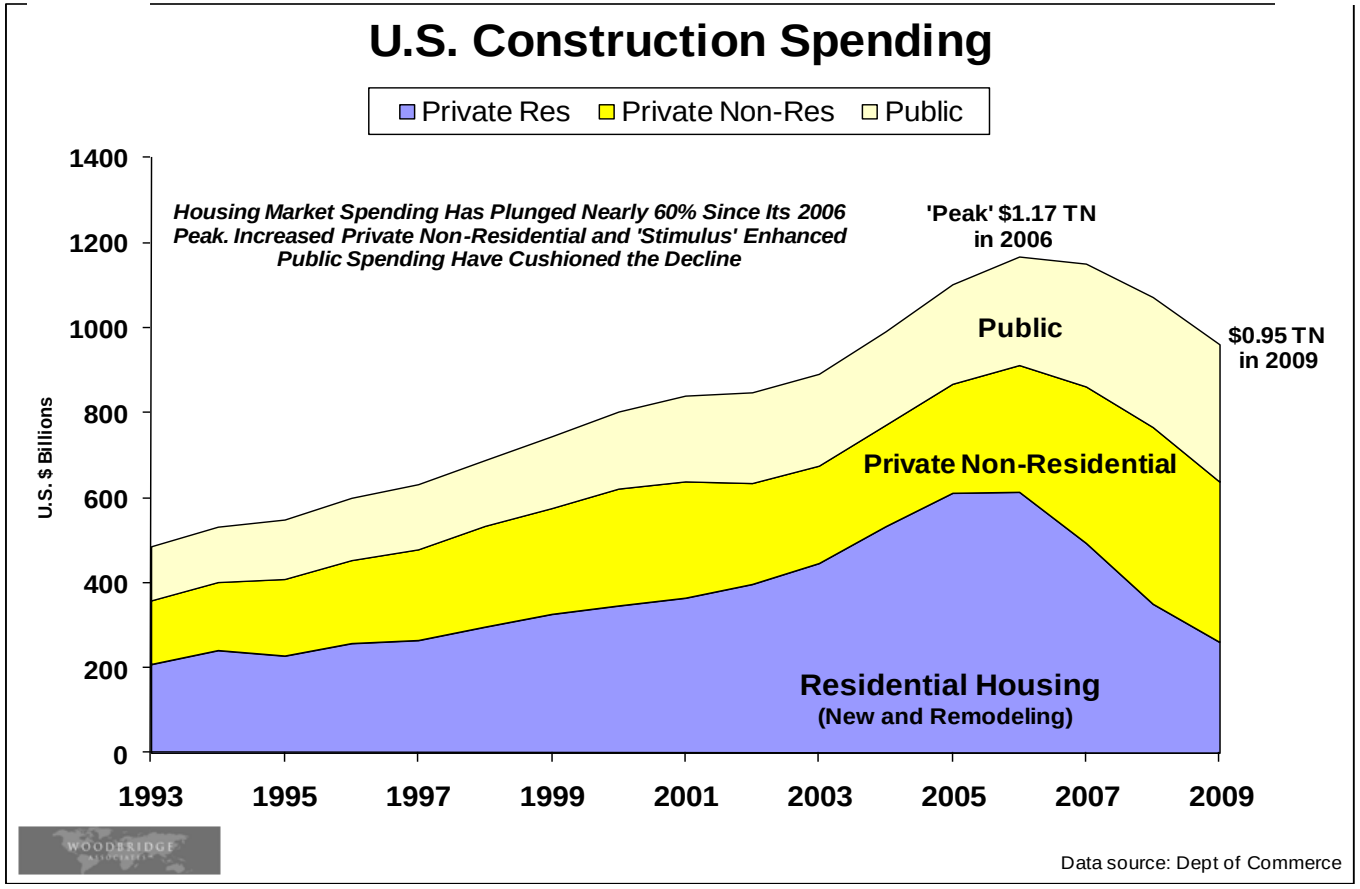


Chart >

U.S. Residential Construction Spending Recovery: Forecast

Year	Total U.S. Starts 000 Units
2009	515
2010	785
2011	922
2012	1130
2013	1500
2014	1500
2015	1500
2016	1800
2017	1800
2018	1800
2019	1800
2020	1800

Woodbridge Associates Inc.

6. Where are the Major North American Markets for WWCBs? (continued)

In contrast to the sharp drop in residential construction spending, the decline in non-residential construction (Chart 24) spending in the United States has had far less impact on building product demand. This is important for WWCB manufacturers because (a) the wide range of market segments that WWCBs serve and (b) the prospect of limited cyclicality most likely would help a new plant located in North America to produce on a consistent basis, at a comparatively high level of capacity utilization.

Demand in Alberta and Western North American Markets

Alberta's domestic market, in the recent past, has provided a substantial demand boost for the province's construction activity. So too has the local home improvement market (Chart 25). Forecasts indicate that Alberta's domestic market for new housing will not be nearly as buoyant as during recent peak years of construction activity – even so, by historical standards, demand will average a comparatively healthy 25,000 units per year (which will include a significant multi-family element). In addition, for WWCBs, the wider 'western North America' market size is significant (Chart 26).

Chart 25

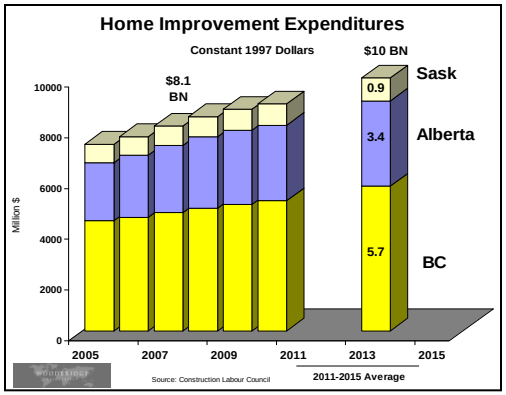


Chart 24

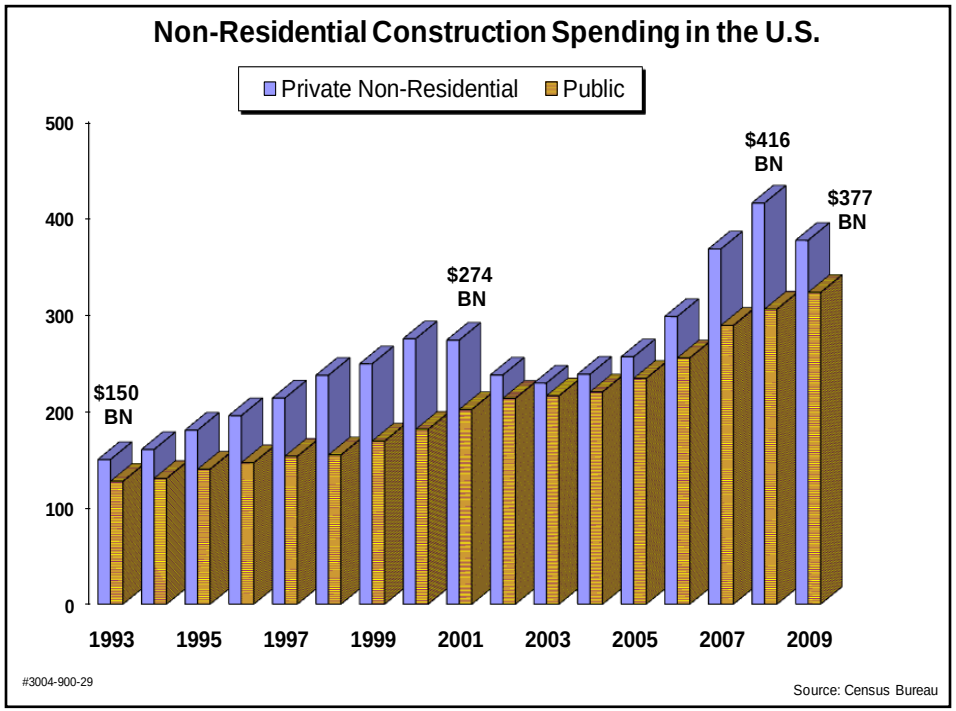
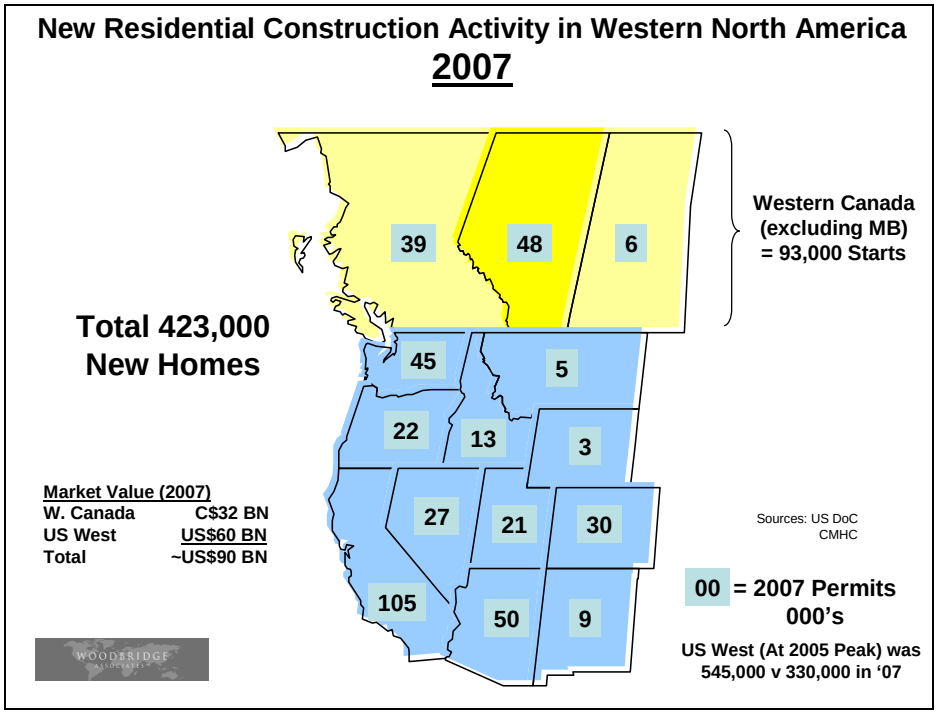


Chart 26



7. Outlook for WWCB Demand Drivers

WWCB Production in Alberta: Export Market Focus

There is a significant domestic market for wood products in Alberta, but export markets account for the bulk of sales revenues for the province's forest industry. Alberta is well connec ted (Chart 27).

During typical years (represented by 2004-2007 averages in Table 1) around 78% of the province's exports were shipped to the United States. The remainder went mostly to Asian markets, with Japan being slightly larger in demand for Alberta's forest products than South Korea and China.

Within North America, most of Alberta's wood products exports are shipped to the US West Coast (54% in 2003). A further 28% was shipped to the US Midwest (Chart 28).

Most of the wood products shipments to these U.S. markets, from Alberta are structural wood products.

As such, they have a high degree of dependency on the U.S. housing market – which, both cyclically and systemically, has been weak in recent years.

Table 1

Total Forest Products Exports ($'000,000)[4]	2004	2005	2006	2007
US	2,925	2,627	2,321	1,822
Japan	250	204	181	160
South Korea	168	156	125	117
China	189	114	113	106
Other	241	256	199	215
Total	3,773	3,357	2,939	2,420

Source: http://www.srd.gov.ab.ca/forests/pdf/economic_impact_AB_forest_fndustry_2008_map.pdf

Chart 27

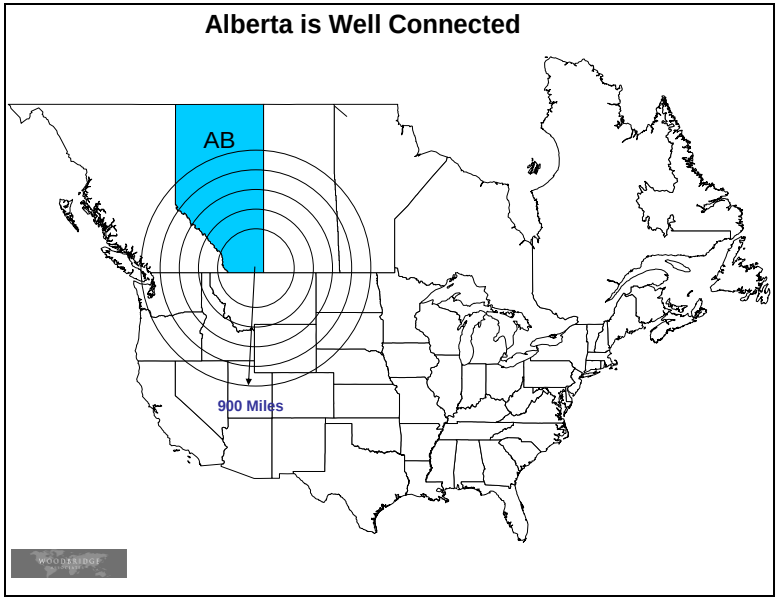


Chart 28

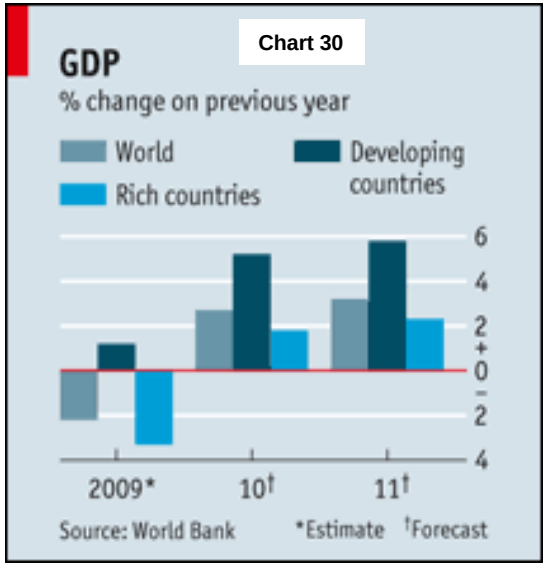
8. Timing of WWCB Investment into Alberta

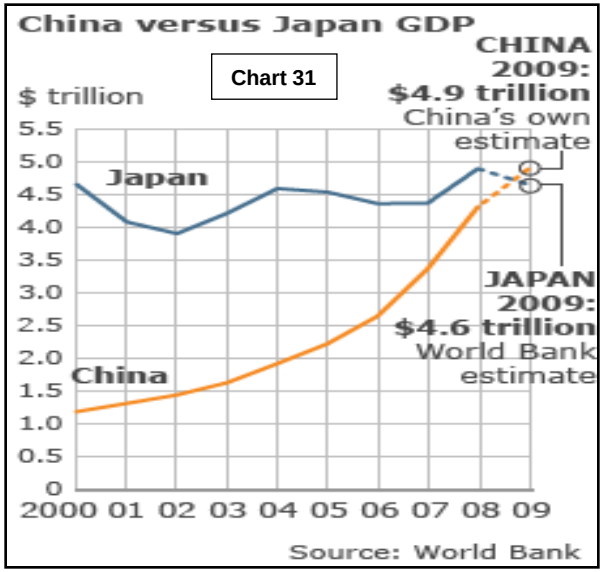
Global and North American Recession

It is generally acknowledged that the path and pace of the global economic recovery is highly unlikely to mirror the high rates of GDP growth and new jobs creation which historically have followed most recessions. Even so, the global and North American economies are beginning to stabilize and recover modestly. Overseas, major engines of economic growth in China and other parts of Asia, are recovering quickly (Chart 29). The chart shows that China far outpaced the G7 countries during 2009 in terms of GDP growth. In the case of all major economies and/or regions, government rescue aid and stimulus packages have a great deal to do with these early signs of recovery. It is by no means certain, however, that they can be sustained at the recent pace – no matter how modest.

No single measures of macro-economic performance are ever adequate. In the current circumstances, a broad array of macro and micro economic data have to be reviewed in order to identify and present a reasonably accurate picture of what is taking place. Such a review is well outside the scope of this report and our terms of reference. Nevertheless, some highlights are important as background data for our economic and market driver assumptions (e.g. U.S. housing starts). Selected highlights are provided below.

The World Bank is predicting that developing countries will lead a global economic recovery in 2010 and 2011 (Chart 30). Importantly, despite the dependence of most nations on stimulus programs, most predictions for the next two years are for positive rates of GDP growth in emerging economies and developed economies. Within this overall picture, there are some stark disparities. Japan's economy, for instance, continues to struggle with few growth prospects. China's GDP may already have exceed that of Japan, to become the second largest economy in the world (Chart 31). It is likely, however, that China may have to moderate its growth rate because of high rates of inflation. Overall, in terms of a new WWCB plant located in Alberta, the timing of an investment of this type appears good.





For Further Information Regarding the Potential Investment Opportunity Presented in this Report, Please Contact:

Alberta Finance and Enterprise

Contact Details to be Added