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**THE REAL STORY ABOUT PAPER SUBSTITUTION
AND OTHER TIMBER MARKET GAME CHANGERS:
WHAT WILL THESE TRENDS MEAN FOR TIMBERLAND INVESTORS?**

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Executive Summary

Four major trends will have a significant influence on rates of global wood consumption during the next decade and beyond. They include: (a) the replacement of writing, printing and graphic papers by electronic media; (b) product advancements that generate increased levels of raw material substitution across wood grades and species; (c) a strengthening social emphasis on the production and use of sustainably-grown timber; and (d) the advancement and adoption of engineered wood products for building and construction uses.

- There is little doubt that the adoption of electronic media through advances in computer technology, wireless communications, and the Internet, has eroded society's need for paper-based media. However, the declining use of printing and writing papers will be more than offset by growth in other pulp and paper market segments. The net effect will be that total paper production worldwide will continue to grow at roughly a 2.6 percent annual rate into the next decade.
- Timber usage and pricing patterns will continue to evolve in the future because technological advances and the broadening tastes of consumers are making it increasingly possible for manufacturers of many solid-wood products to replace or substitute certain log species, sizes and grades with others that have not been traditionally used for such purposes. This means price premiums for some species and log grades will be more difficult to obtain and sustain in the future. Conversely, it also means that certain under-utilized or under-valued species will have greater market potential than they have in the past.
- Increasing social awareness about the prevalence and environmental impacts of illegal and unsustainable timber harvesting are increasingly resulting in (a) increased government regulation designed to curtail illegal logging and ensure stronger and more consistent enforcement of associated laws, and (b) the broader and more consistent adoption of forest certification and sustainability standards by timberland owners, the forest products industry, wholesalers, retailers and the consuming public. Together, these trends will reduce global reliance on publicly-owned forests that are maintained in their natural states and place greater timber production pressure on privately owned, intensively managed working forests.
- The fourth global trend that will influence timber and timberland markets will be the continued advancement and adoption of engineered wood products. Engineered wood products have progressively emerged as effective substitutes for certain solid lumber products as well as for other traditional building materials, including steel and concrete. This trend will gradually shift timber demand away from larger diameter sawlogs and toward smaller diameter logs.
- In general, economic growth and rising global income levels in the future will drive increased global demand for timber. However these gains will not be evenly distributed across geographies, species and wood types. Consequently, timberland investors will need to understand how market shifts and product innovations will alter the global timber trade and recognize how this, in turn, should influence the composition and management of their timberland portfolios.



Introduction

How the world uses a natural resource can change dramatically over time. Some resource markets grow while others atrophy. In the eighteenth and nineteenth centuries, for instance, whaling was a major commercial enterprise. Whales were hunted heavily worldwide for food, oil, soap, perfume, and women's corsetry (from whale baleen), among other things. In modern times, however, whaling is largely a marginalized industry because cost-effective substitutes for whale-based products were found or developed and because social tastes and fashions changed over time.

How will timber fare in the future in the face of such changes? Some fear evolving timber demand patterns and the encroachment of effective substitutes for wood products will undermine commercial timber markets. The consuming public's rapid shift during the last decade away from the use of physical media, like newspapers, magazines and books, and towards the use of electronic media, such as computers and the internet, has highlighted this concern by undercutting demand for newsprint and other graphic paper products. On the other hand, new technologies and the public's growing preference for environmentally friendly materials are creating new sources of demand for wood. For instance, as personal and household incomes grow in developing countries, consumers in those countries who are enjoying growing affluence are increasingly choosing wood furniture, wood cabinetry and hardwood flooring over non-wood alternatives.

These changes in global wood demand patterns are both creating and curtailing value enhancement opportunities for timberland investors. As a result, understanding their origins and implications is essential for making strategically driven investment decisions about where, how and in what types of timberland assets to invest. This paper examines four major trends that are expected to have a significant impact on global wood consumption patterns through the next decade and beyond:

1. Replacement of paper by electronic media
2. Product advancements that create greater substitution across wood grades and species
3. Social mandate for sustainably grown, certified timber
4. Advancement and adoption of engineered wood products for construction

We will first analyze how these trends are likely to influence the behavior of global timber markets in the future. That analysis will be followed by recommendations that focus on how investors can adapt their investment strategies to capitalize on, and mitigate the impacts of, these market forces.



Replacement of Paper by Electronic Media

There is little doubt that the adoption of electronic media through advances in computer technology, wireless communication, and the Internet, has eroded consumer demand for paper-based media. Between 2008 and 2013, for instance, the circulation of printed magazines in North America fell from 410 million to 335 million. This 18-percent decline was driven by consumers' growing propensity to utilize the Web as their primary source of news and information.¹ Likewise, the U.S. Postal Service recently reported that it delivered 30 percent less first-class mail in 2013 than it did a decade ago. Meanwhile, consumers have been rapidly adopting computer tablets and e-book readers, like the Apple iPad and the Amazon Kindle – with as many as 40 percent of adult Americans owning one or more such products in 2013.²

For these reasons, printing and writing paper usage in many developed economies, including those in North America and Western Europe, has fallen dramatically during the last decade. This has resulted in the closure of many paper and newsprint mills, including International Paper's massive Courtland, Alabama facility, which ceased operations in 2014. While electronic media continues to be substituted for news and information products manufactured from paper, the picture this trend paints of the broader pulp and paper market is incomplete. Newsprint and other printing and writing papers are only one of the end-use markets for wood pulp – and while that particular segment is declining because of slackening demand, most others are stable or are expected to experience continued growth in the future. In general, three factors are mitigating the influence of the decline in the printing and writing paper segment.

First, in many cases, paper is considered environmentally attractive when compared with other materials that are used to produce common consumer goods. Produced from an infinitely renewable material, wood, paper is biodegradable. The same cannot be said for plastic, which is typically made from petroleum or natural gas by-products. For this reason, paper cups and shopping bags are viewed by consumers as more environmentally friendly than their plastic alternatives. Fast-food giant McDonalds, for instance, have announced that it is replacing its polystyrene plastic cups with paper cups because of pressure from consumers to package its products in a more environmentally benign fashion. In addition, certain municipalities, such as San Francisco (2007) and Seattle (2009), have forbidden the use of plastic foam food containers by stores and restaurants. Because of this trend, demand for paper packaging products by the food, restaurant and hospitality sectors is growing. In fact, according to the American Forest Products & Paper Association, U.S. demand for the types of paper used in the manufacture of paper cups has risen 16 percent during the last five years.

The second factor that is mitigating eroding conditions in the printing and writing paper segment is that paper is a highly competitive manufacturing input in other consumer sectors, like sanitary products. That sector includes household staples like bathroom tissue, facial tissue and paper towels. Paper also plays a major role in the food packaging and shipping sector because of its sturdy, light-weight and low cost production properties. If you buy from an on-line retailer, such as Amazon.com, for instance, the product you purchase is likely to be shipped in a corrugated box made from paperboard. In part because of the growth in internet-based commerce, paper and paperboard have held their market share in the face of growing competition from non-wood alternatives. In fact, Smithers Pira, a British market research institute, predicts world demand for paper-based packaging will

¹ Alliance for Audited Media

² Rainie, Lee and Smith, Aaron. "Tablet and E-reader Ownership Update." Pew Research Internet Project: October 18, 2013.



grow by four percent annually over the next five years through 2019.³ The firm believes this will cause global demand for containerboard to increase from 90 million tonnes a year in 2013 to 115 million tonnes per year by 2019.

The third and final factor that is mitigating the declining conditions in the writing and printing paper segment is that wood pulp is used to manufacture products other than paper and packaging. This includes specialty products like fluff pulp, dissolving pulp, viscose pulp and hi-alpha pulp. Among other things, specialty pulps are used to make diapers and filters. They also are used to manufacture textile fibers, like rayon, and industrial substances like acetate, nitrate and cellophane, which are used extensively by the chemical, pharmaceutical and food service industries.

Consequently, while the printing and writing paper segment is declining, other segments in which wood-based pulp plays a key role, including packaging, shipping, textiles, resins and food additives, continue to experience healthy growth. The forest products industry has responded to these trends by adjusting its production output. While some mills that traditionally have been major producers of newsprint and graphic publishing papers are being closed, others are being retrofitted and converted to produce products that face growing demand, like containerboard, tissue and dissolving pulp.

Global Outlook for Pulp and Paper

When the pulp and paper sector is viewed in its entirety, it is clear that the declining use of printing and writing papers will be more than offset in the future by growth in other segments. According to RISI, a forecasting firm covering the wood products sector, the net effect will be that total, global paper production is projected to grow at roughly a 2.6 percent annual rate into the next decade (see Figure 1).

³ "Demand for Corrugated Packaging Material to Reach \$176 billion by 2019." Smithers Pira: March 13, 2014.

Global Paper and Paperboard Consumption by Grade
Historic and Forecast (1997-2021)

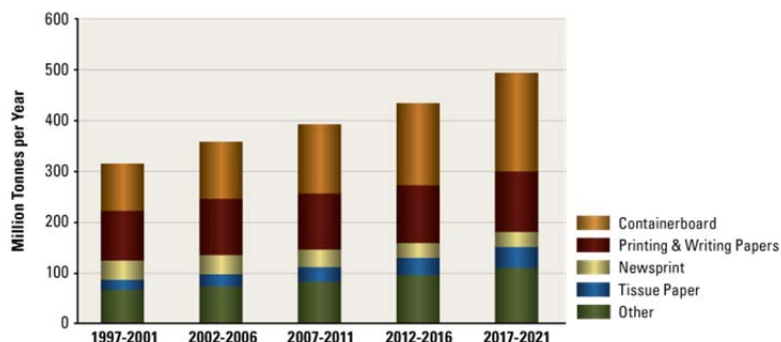


Figure 1. Annual global paper and paperboard consumption separated by grade. Forecasts through 2021 are from RISI’s World Pulpwood Study.

As the stacked bar chart below (Figure 2) illustrates, the global market shares of newsprint and printing and writing papers are each expected to steadily decline in the face of electronic media substitution – collectively falling below one-quarter of global paper and board consumption by the next decade. However, the chart also demonstrates that these declines will be offset by continued gains in the tissue and containerboard segments, which will see their combined market share grow from 38.1 percent to 47.9 percent.

Historical and Forecasted Global Paper and Paperboard Consumption by Grade (1997-2021)

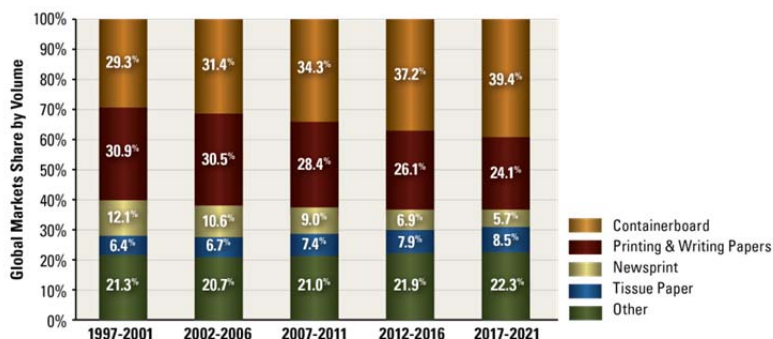


Figure 2. Share of global paper and paperboard consumption by volume across different pulp and paper grades. Forecasts through 2021 are from RISI’s World Pulpwood Study.



Implications for Timberland Investors

On a macro-level, the long-term health of the pulp and paper industry should not be of concern to timberland investors. Demand for pulpwood (small diameter logs that can be chipped to produce pulp) will continue to increase in response to increasing demand for a variety of pulp and paper products. Nevertheless, the shifting market dynamics underway in the printing

and writing papers segments – particularly in the developed economies of Western Europe and North America – will require investors to conduct careful analyses of the milling assets to be served by their prospective timberland investments. In particular, their due diligence efforts will have to include assessments of the competitive viability of nearby pulp and paper mills to determine whether the facilities will be subject to eventual closure if the product they produce is losing market share.

Technological Advances Will Allow for Broader Timber Product Substitution

The second major trend that will influence global wood consumption during the next decade and beyond will be technological advances that broaden the potential for substituting species and log grades in the manufacture of wood-based, end-use products. In short, innovation is increasingly making it possible for manufacturers to substitute cheaper, more plentiful timber products for the scarcer and more expensive grades they currently utilize to make their products. Such innovations will create a more interlinked global market for wood, which, among other benefits, will expand the capacity of timberland investors to diversify their sources of cash flow.

Cross-species substitution is one way in which innovation is occurring within the wood products sector. In this case, lower quality, commonplace woods that have grain patterns similar to those of rarer, more commercially desirable species can be milled or treated in ways that improve their appearance. This can expand their manufacturing uses and their potential to generate value. For instance, poplar, a relatively common and lower quality hardwood species, often can be stained to look like walnut, which is in high demand for furniture and cabinetry. The same is true for alder, a light-colored wood that can be stained to look like deep-colored cherry. Likewise, many tropical hardwoods are virtually interchangeable when it comes to their commercial uses and this also provides attractive product substitution opportunities. For instance, when it is milled, high quality mahogany, which is in great demand for decking, flooring and furniture, is very similar in

appearance and has properties like those of lower value cedar (*Cedrela odorata*), andiroba (*Carapa guianensis*) and curupixá (*Micropholis venulosa*).

While mimicking the appearance of higher value timber products is a viable strategy for increasing the usage potential of lower quality woods, such efforts are not always necessary. In many markets across the world, tastes are evolving and consumers are becoming more receptive to buying and utilizing different types and species of timber – especially when this can be done at a lower cost. Take the case of wood flooring, which is commonly thought to be a product produced almost exclusively from northern hardwoods. In recent years, flooring products made from tropical woods like eucalyptus and bamboo have been capturing increasing amounts of market share because, unlike oak, cherry and maple, both species can be grown quickly and cost effectively in managed plantations.

The manufacture of tissue products offers another excellent example of how innovation is changing wood usage patterns. Traditionally, such products have been made from softwood pulp because the long fibers present in softwood species like pine and fir have the strength and flexibility required to produce high quality cleaning, bathroom and facial tissue products. However, pulp made from Latin American eucalyptus (a hardwood) is considered more plentiful and less expensive than softwood pulp and recent technological advances have allowed Brazil to produce a stronger eucalyptus pulp. At present, this pulp is an effective, lower-cost substitute for northern-bleached, softwood



kraft (NBSK) pulp. In effect, these innovations will gradually increase demand for hardwood pulp and the price premium between that product and softwood pulp will narrow.

In addition to species substitution, we also are seeing substitution across log sizes and grades. Specifically, end-use products made from smaller diameter, lower-value timber products are increasingly supplanting those made from larger, more expensive, types of timber. In North America, for instance, oriented strand board (OSB), which is made from thin wafers of small pulpwood logs, has largely replaced plywood, which is made from more expensive sawtimber logs, in construction applications like floor underlayment and wall sheathing (see Figure 3). Medium density fiberboard (MDF), another product made from pulpwood or wood chips, can be surfaced with a hardwood veneer. As a result, MDF can be used to produce cabinets, flooring and furniture – products that traditionally have been manufactured from solid hardwood timber. Similarly, decking and siding products have historically been produced from a composite of wood fibers and plastic. However, because of advances in manufacturing technologies, composite decking products now can be made to resemble natural hardwoods, like redwood

(*Sequoia sempervirens*) and ipe (*Handroanthus* spp.).

Implications for Timberland Investors

The usage barriers that have ordered timber markets in the past are gradually eroding because of the development of new manufacturing technologies and broadening consumer tastes. These trends will make it more difficult for timberland owners to obtain and sustain price premiums for some high-value grades of timber in the future. However, they also may improve the investment potential of species and grades that have been under-utilized and under-valued. From an investment strategy standpoint, this will mean that when investors conduct due diligence on prospective acquisitions they will need to consider whether the valuation of a particular timberland asset depends too heavily on achieving market premiums for timber products that are highly valued in the near term, but that may be subject to substitution pressure in the future. In general, such properties should be acquired at discounted prices – or sold from an existing portfolio before market conditions shift and become disadvantageous. Likewise, it will be important for investors to have an informed perspective on the evolving market potential of timber grades and species that may be, at present, experiencing relatively light demand or unimpressive pricing dynamics. Properties with these characteristics actually may offer the investor attractive upside potential – especially if the assets will be held over a long time horizon.

Historical and Forecasted U.S. Market Share of Structured Panels by Volume (1994-2017)

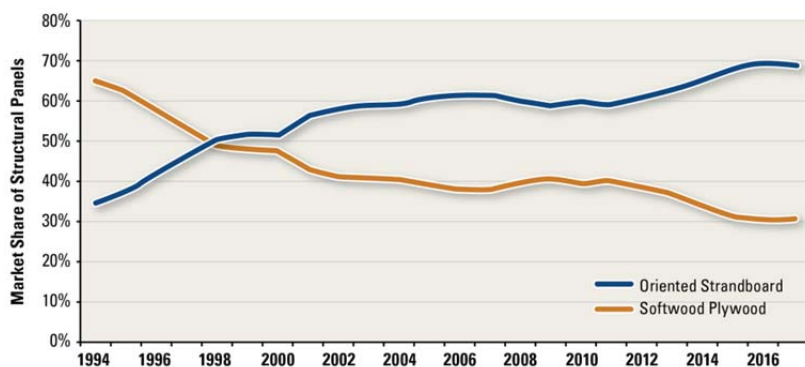


Figure 3. Market share of U.S. consumption of structural panels from 1994 through 2017 -- sorted by oriented strandboard (OSB) and softwood plywood. Forecasts from 2014 through 2017 are from RISI.



Social Mandate for Sustainably Grown, Certified Timber

The third major trend that will impact wood usage patterns in the future, and thus help alter the global timberland investment landscape, will be heightened social awareness about illegal and unsustainable timber management and harvesting practices.

According to a 2014 study by the United Nations Environment Programme (UNEP) and INTERPOL, an estimated 10 to 30 percent of the world's total timber trade, which is worth between US\$30 billion and US\$100 billion annually, is the result of illegal logging and forest crime.⁴ Among other things, this includes harvesting in places that are off limits for commercial logging and harvesting protected tree species. Even harvests that are perfectly legal face growing scrutiny and opposition from environmental groups, governments and the public at-large when issues of long-term forest health and sustainability are in question. In many global timber markets, particularly those that depend on wood from natural forests, the public is increasingly demanding that the wood sourced for the manufacture of consumer products be produced and harvested under socially responsible and environmentally friendly regimes. These efforts are being manifested in two ways: (a) through new government regulations and stricter enforcement of bans against illegal logging, and (b) by the adoption of forest sustainability and green certification standards by industry producers and the consuming public. Together, such measures are reducing our reliance on natural forests as sources of wood products. They also are creating greater demand for timber grown in privately owned and intensively managed working forests.

The effort to reduce illegal logging, and the frequency with which improperly sourced timber is making its way into global markets, is being led by the major industrialized countries of the world, which have been enacting tough new laws and legislation. In 2008, for instance, the United States Congress adopted amendments to the Lacey Act, which bans trade in illicitly sourced timber, wood and paper products. The European Union (EU) has been equally aggressive. In 2003, its member countries established the Forest Law Enforcement, Governance and Trade (FLEGT) program. FLEGT's goal is to exclude timber that has been illegally harvested from global timber markets and to provide increased support for the responsible management of the world's forests. The EU followed this initiative in 2013 with an additional measure called the EU Timber Regulation (EUTR). It strictly outlaws illegally harvested timber, and products produced from it, from the EU market. Other countries are following these examples by enacting similar legislation. Australia, for instance, passed a ban in 2013 on the import and trade of illegally sourced wood and wood products.

As a result of this increasingly intense regulatory climate, many emerging countries that see the US and EU as major trading partners have strong incentives to stamp out illegal logging and to promote sustainable forestry within their borders. However, the pressure they face in this regard is not completely external. As citizens of these countries become more environmentally conscious, there is growing domestic support for measures designed to curb deforestation and illegal logging. In fact, many of the timber producing countries of East Asia and Latin America have made significant inroads in the fights to reduce illegal logging and to promote sustainable forestry. In Brazil, for instance, deforestation in the Amazon region fell in 2012 to its lowest level since monitoring began in 1988 – declining by 78 percent during the intervening 24 years.

⁴ "Illegal Trade in Wildlife and Timber Products Finances Criminal and Militia Groups, Threatening Security and Sustainable Development." United Nations Environment Programme: June 24, 2014.



Although much work has yet to be done, the world is already seeing the benefits of these efforts. According to a report by the Union of Concerned Scientists, forests were being lost at an estimated annual rate of 16 million hectares (40 million acres) in the 1990s.⁵ By the early 2000s, however, global rates of deforestation had fallen 19 percent to 13 million hectares (32 million acres) per year.

In the case of North America, for example, the Sustainable Forestry Initiative (SFI) certification program is part of PEFC. About 84 million hectares (208 million acres) are certified under the FSC framework in 80 countries. As of June 2014, the PEFC's affiliated programs had 255 million hectares (630 million acres) being managed under third-party certification regimes.



Figure 4. The logos above are those of the world's two leading certification systems: the Forest Stewardship Council (FSC) (left) and the Programme of the Endorsement of Forest Certification (PEFC) (center). The logo to the right is that of the Sustainable Forestry Initiative (SFI), which is the leading North American forest certification program. It is administered under the auspices of the PEFC.

Beyond international efforts by governments and environmentalists to reduce illegal logging and forest loss, there has been a separate (but complementary) movement towards voluntary third-party forest certification. The goal of certification is to give the public confidence that the timber used in consumer products has been grown and harvested in a sustainable and environmentally responsible manner. The two leading forest certification systems are the Forest Stewardship Council (FSC) and the Programme of the Endorsement of Forest Certification (PEFC). The latter is an umbrella organization under which a number of national certification systems operate.



Established in 1994 and 1999 respectively, both FSC and PEFC (and its affiliates, including SFI) are non-profit, non-governmental organizations. Each program includes a chain-of-custody component, which ensures that industrial timber buyers, and the customers who ultimately purchase the products they produce (paper, packaging, fuel pellets, building materials, furniture, etc.), can be certain that those products were manufactured from wood grown in sustainably managed forests. This stamp of approval is represented by a certification seal,

⁵ "Report Finds Successful Efforts to Reduce Deforestation." Union of Concerned Scientists: June 4, 2014.



which appears on the product itself or on its packaging.

Implications for Timberland Investors

As governments around the world increasingly adopt and enforce laws designed to curtail illegal logging, and as consumers increasingly endorse forest certification as a litmus test for the purchase of wood-based products, demand for wood grown in sustainably managed private forests will increase. This will include timber produced in fast-growing plantations in the emerging economies of Latin America and Southeast Asia as well as timber grown in the working forests of developed countries like the United States, Canada, and New Zealand. For instance, natural hardwoods grown under sustainable and certified management regimes in the US Northeast and

Northern Europe will be increasingly substituted for hardwoods grown in the tropical natural forests of Southeast Asia and the Amazon Region, which will be subject to more onerous trade restrictions in the future.

As governmental actions and consumer pressures against illegal logging increasingly impact global timber markets, timberland investors can position themselves to benefit by acquiring forests stocked with timber species that are likely to experience rising demand in the future. They also may benefit from participating in forest certification programs. While such participation is accompanied by an increase in fixed management and administrative costs, it also may facilitate broader and easier access to certain global timber markets, like those of the EU countries.

Advancement and Adoption of Engineered Wood Products

The final major trend that is likely to influence global timber markets in the future is the continued development, advancement and adoption of engineered wood products. In general, the consuming public is unaware of the degree to which engineered wood products are already impacting its buying choices. However, such products have become effective substitutes for solid wood and non-wood framing, paneling, roofing flooring and foundation applications in the

building and construction sector.

Engineered wood products are a class of building materials that are made from composites or frameworks of small lumber grades, veneers and wood strands. When combined using adhesives and specialized technological processes, these smaller pieces of wood can have structural properties that are superior to those of solid wood. In fact, in certain instances, the properties of engineered wood products can rival those of steel and concrete (see photo).



Some leading examples of engineered wood products include wood I-joists, laminated veneer lumber (LVL), cross laminated timber (CLT), and roof trusses. In many cases, engineered wood products are made from cheaper, smaller diameter timber grades. In some cases, they also can make larger diameter timber products stronger and more versatile. As a result, the raw material costs of engineered wood products, in certain cases, are lower than those for competing materials, like solid wood, steel and concrete.



Examples of Engineered Wood Products



Figure 4. Illustrated examples of four engineered wood products

There are three primary reasons engineered wood products are increasingly being used in construction projects around the world.

Shortened Build-Out Times: Many engineered wood products and systems can be custom designed and manufactured off site. For instance, wood roofing and flooring trusses can be produced in a factory to pre-established specifications before being delivered to a construction site at the precise time when their installation has been scheduled. In Europe, for example,



manufacturers have perfected the process of building whole wall and flooring segments with cross laminated timber (CLT). These engineered wood applications include pre-cut openings for entrances and windows. This ensures the timely, efficient and cost effective installation of wall panels and flooring systems in new construction projects.

Lower Material Costs: As was referenced earlier, another benefit of utilizing engineered wood products is that they can be produced on a cost-effective basis relative to other types of building materials. This can include dimensional lumber, which, traditionally, was the preferred product for framing applications. As the chart below demonstrates, for this reason, over the last two decades, home builders in the U.S. have increasingly used engineered wood products such as wood I-joists and laminated veneer lumber (LVL) in home construction projects (Figure 5).

Average Use of Laminated Veneer Lumber in U.S. Home Construction

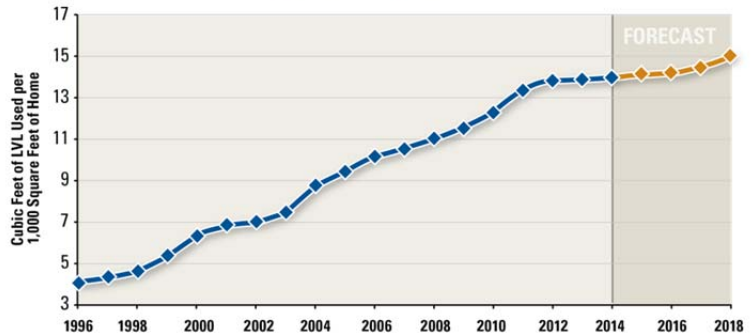


Figure 5. Average use of laminated veneer lumber (LVL) per 1,000 square foot of living space built in U.S. homes from 1996 (historical) through 2018 (forecast).

Environmental Considerations: Finally, engineered wood products are considered environmentally friendly. Many builders and architects recognize that wood has a lighter environmental footprint than steel or concrete. Instead of releasing carbon into the atmosphere, as happens when steel and concrete are manufactured, carbon is captured and stored in engineered wood products. In fact, an architect recently estimated that using wood rather than



steel or concrete to complete a 20-story construction project would reduce the project's carbon emissions by 4,300 tons. Unlike steel and concrete, wood is also a renewable resource. For these reasons, the use of engineered wood products can help a construction project receive a "green" building certification, such as LEED (Leadership in Energy and Environmental Design), or other voluntary "green" building codes.

As advances in engineered wood products are made, and as builders gain experience in using them, the frequency with which multi-story structures will be constructed mostly from wood will increase. Last year, the real estate investment and management firm, Lend Lease, completed the world's largest residential building made mostly of wood – the ten-story Forté Tower in Melbourne, Australia. With the success of that project, Lend Lease has announced that it intends to make greater use of cross laminated timber (CLT) in future multi-residential construction projects. The company's Forté Tower project will be surpassed in 2015 when a 14-story apartment complex called Treet ("The Tree") is due to be completed in Bergen, Norway. Among other things, the Treet project will be built with meter-thick glulam (glue laminated timber) columns.

Conclusion

As this paper illustrates, global timber markets continue to evolve in response to evolving demand dynamics for wood-based products. As a result, it is important to view the trends shaping timber markets comprehensively and holistically – to avoid drawing conclusions or making assumptions about total wood consumption trends based on the growth or retraction of certain market segments. For instance, timberland investors should understand that while the growth of electronic media is having a dampening effect on demand and pricing for products like newsprint, writing papers and graphic printing papers, this does not mean that the entire pulp and paper sector is in decline.

As was illustrated earlier, wood is used to produce an incredibly broad and diversified array of

Implications for Timberland Investors

The slow, but persistent expansion of engineered wood products into the residential and commercial construction sectors will have two major implications for timberland investors. First, as these products encroach into segments of the building materials markets that have traditionally been dominated by large-dimension solid lumber products, timber demand will gradually shift toward younger, smaller diameter logs. As a result, over the long term, the rates at which prices for large sawtimber logs accelerate are likely to slow. However, this will not be a zero sum game. The use of engineered wood for the construction of multi-story buildings will mean that total, construction-based wood usage will grow. This, in turn, will support rates of total wood consumption. In light of these developments, timberland investors will benefit from taking note of the timber species most commonly used to produce engineered wood products as well as of the regional markets where they are being manufactured. Likewise, investors should focus on building well-diversified timberland portfolios – not portfolios that consist of assets overly stocked with mature, large diameter sawtimber trees.

products across the global economy. Products produced from timber are key contributors in numerous industry sectors – from food services, packaging and shipping, mass media, pharmaceuticals, chemicals, furniture manufacturing and building and construction. Based on shifting consumer needs and product innovations, some of these market outlets can be expected to grow while others will mature and decline. This intricate web is also characterized by crossover effects – where positive gains in one market segment can generate retraction in others. The growing popularity of composite decking and siding is a case in point. This trend may help increase pulpwood demand, but, conversely, it could cause demand for traditionally popular decking materials, like large diameter sawlogs produced from species like western red cedar and



redwood, to decline. Likewise, as engineered wood products are increasingly used in place of other building materials, like large-dimension framing lumber, the rates at which prices for softwood sawlogs accelerate in the future could decline.

The good news for timberland investors is that global economic growth, including rising levels of personal income, are driving increased global consumption of timber. However these gains will not be evenly distributed across geographies, species and wood types. As a result, it is important for timberland investors to recognize

and understand how these market shifts and product innovations will alter the global landscape for timber demand and trade. Some markets will become more competitive in the future; other less so. In this regard, the table below highlights some of the key trends about which investors should be informed. Timberland Investment Resources, LLC (TIR) recommends investors work closely with their timberland investment managers (TIMOs) to craft well-defined strategies that take advantage of emerging opportunities and that limit or reduce exposure to markets, species and products that are likely to be characterized by future weakness.

Table 1. Long-term opportunities and risks that could have implications for timberland investors as a result of the four, major market trends that this paper suggests will alter global timber markets over the next decade.

Market Development	Opportunity	Risk
Replacement of paper by electronic media	Seek timber markets with modern, efficient mills that produce specialty pulps, containerboard and tissue to gain exposure to end-use product segments that are expected to expand or remain robust	Avoid or reduce exposure to markets dominated by mills that produce writing and printing papers and that therefore may be subject to future closure or production curtailments
Greater substitution across wood grades and species	Recognize that timber species or grades that are presently discounted could recover if there are surrounding mills that could utilize those resources in the future in response to emerging substitution innovations or opportunities	Recognize that timber species and log grades that presently enjoy high price premiums may see those advantages erode over the long-run if smaller, lower quality, lower value timber products can be used to produce the same, or similar, end-use consumer products
Social mandate for sustainably-grown, certified timber	Invest in plantation-grown timber products and species, like teak and mahogany, that compete with timber that is grown, and is perhaps illegally harvested, in natural forests to capitalize on increasing consumer demand for products that are manufactured from responsibly-grown and sourced woods	Recognize and account for the fact that while participation in forest certification programs may provide access to certain timber markets, it also can increase fixed management costs without generating near-term product price premiums
Advancement and adoption of engineered wood products for construction	Invest in timber markets located near modern mills that make engineered wood products, or components of engineered wood products (e.g., studs and OSB), to capitalize on steady or growing demand for smaller logs	Recognize that the market for large diameter sawtimber may not grow at the same rate in the future as the markets for pulpwood and small diameter sawtimber



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