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IWC NEWS

HOW TECHNOLOGY IS RETURNING TO ITS ROOTS

Look around and take in what you see: LCD computer screen? Halogen lamp? Blinking iPhone? Are you sitting on a chair made of plastic and synthetic upholstery? Or maybe you're reading this article from printed paper, resting your arms on a wooden desk, while reclining on a wooden chair. The former scenario most likely reflects your situation, yet you would probably agree that the later sounds more appealing. Though modern technology has created today's necessities, there is something to be said about the natural qualities of wood that can't be replaced. This article provides examples of where wood has become the substitute for less environmentally friendly, less sustainable products of modern technology, and not the other way around.

Wooden turbines

Recent data shows that global wind power capacity increased in 2012 by 19 % and in recent years has had an annual growth rate of 25 %[1]. Siemens has become one of the world leaders in turbine manufacturing, producing 75 metre long rotor blades. What makes these super blades possible and extremely durable are the components: glass fibre-reinforced epoxy resin and balsa wood; resulting in a final product without seams or joints. Balsa's light-weight characteristics allow the blade to weigh 20 % less than other similar blades. These turbines can produce six megawatts of power, compared to the first modern turbines that generated 30 kilowatts. Furthermore, the manufacturing process reduces costs by 25-40 % compared to the original turbines – making wind energy that much more economical[2]. More recently, wood is also being used to construct turbine towers. German company, Züblin, is making 140 metre turbine towers out of beech plywood and Cross Laminated Timber (CLT), with their next projects to reach 160 metres. The tower's strength is comparable to steel, but lighter in weight. It is also better able to cope with tension than steel, which suffers from metal fatigue due to constant wind exposure. The company has already invested EUR 100 million into a facility for the manufacturing of 180,000 cubic metres of plywood and CLT per year – making it the largest hardwood sawmill in the world[3].

Long lasting wooden batteries

Though rechargeable batteries make it possible to un-plug our electric devices from the grid, the cells themselves can be harmful to the environment due to toxic metals used to make them (such as nickel and cobalt). Using lithium ion technology, the ions transport current from the negative to positive electrodes in the cell, discharging the stored power in your mobile device. Recent research from the University of

BALSA BEECH PLY
WOOD

20% LESS

6 MEGAWATTS OF POWER

REDUCE COSTS
25-40%

CLT Cross Laminated Timber is an engineered wood product where sheets of wood are layered and laminated on top of each other; generating strength from alternating direction of fiber grain. This makes the panels stronger than traditional lumber, allowing for more challenging structures to be built from wood.

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Maryland has resulted in the development of a rechargeable battery where wood fibers are used together with sodium ions to carry the current in a similar mechanism to the lithium ion batteries – however this solution is completely renewable. As sodium ions have lower energy density, they will be more appropriate for use in large scale industry or to store vast amounts of energy at solar power plants[4].

Yellow pine has been found an effective species for this technology, as its cellulose is naturally flexible and can withhold the strain of the swell of continuous re-use. By coating the cell in a thin layer of tin, results have shown that these batteries can be used over 400 charging cycles – longer than their lithium brothers, and the most of any nano-scale battery.

Wooden skyscrapers

Skylines are growing with population and urbanization. According to the World Bank, currently 3.5 billion people live in cities, and by 2030, this number is expected to grow to five billion. At the same time, we are becoming ever more aware of the growing population's impact on the planet.

When considering the need to build urban housing for some 1.5 billion people over the next 15 years, in light of climatic concerns, the choice of building materials is critical. Where steel and concrete production are guilty for their CO_2 emissions, wood on the other hand, stores carbon and is a renewable resource. Thus, the challenge to build more urban housing, using sustainable products has materialized – and this has recently been addressed by rethinking wood. Currently, wooden buildings are more mid-rise in height – take the nine storey Murray Grove tower in London (2009), or the 10 storey Forté apartments in Melbourne (2012) for example, both constructed out of CLT panels. However, sights are being set higher. CF Møller architects have recently won an

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WOODENBENEFITS

RENEWABLE

LESS ENERGY TO PRODUCE

STRONGER THAN CONCRETE

FIRERESISTANT

HEALTHY INDOOR CLIMATE

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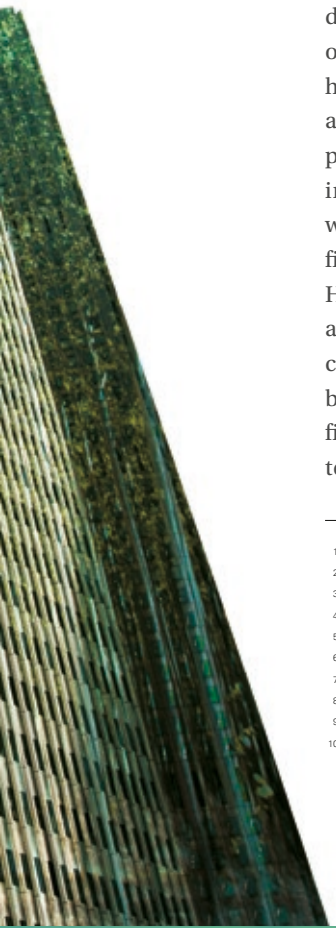
international competition to build what will become the world's tallest wooden skyscraper (also built from CLT panels); a 34 storey residential high-rise in Stockholm[5] set for completion in 2023. The current challenge appears not to be in the technology, but in strict building code regulations. Architect Michael Green from Vancouver, B.C. is a strong advocate for the update of building codes (namely in the US) to allow for taller wooden buildings. The benefits are insurmountable – wood is renewable, it takes less energy to produce than concrete and steel, through CLT engineering can be stronger than concrete, they are fire resistant, and create a healthy indoor climate. The USDA, which has recently come on board, believes that the construction of a modest four storey building made out of CLT could cut emissions to a similar level of taking 500 cars off the road for a year[6].

Wood comes full circle in energy and structural development

People have been using wood for energy since cavemen could rub a stick and make fire. Of course, modern day technologies in the developed world have allowed us to access other means of energy such as fossil fuels, hydroelectricity, nuclear and thermal power and more recently advanced wind and solar power. These later advancements are gaining technological ground through the use of wood. In the same light, wood was among the first construction materials known to man. However, modern day high-rise needs see architecture tending towards steel beams and concrete – but wood is making a comeback. In both energy and structural innovation, wood fiber is being engineered, improving both technology and sustainability.



[1] REN21 2013
[2] EWEA 2012
[3] Politiken, 2014-04-13
[4] Extremetech, 2013-06-20
[5] Architecture news daily, 2013-12-14
[6] The Economist, 2014-04-02
[7] Biochar International, 2014
[8] Novozymes, 2014
[9] Fraunhofer, 2014
[10] Bloomberg, 2014-01-26

OTHER DEVELOPMENTS IN WOOD TECHNOLOGY

BIOCHAR is a 2000 year-old practice that converts agricultural waste into a natural fertilizer and stores carbon. Obtained from the carbonization of biomass, this charcoal is put to more sustainable use when put back in the ground than when burned for energy[7].

CELLULOSIC ETHANOL is a fuel derived from biomass containing cellulose, such as wood pulp from trees, that is now being commercialized. Studies have shown it can reduce CO_2 emissions by 90 % over petroleum based fuels[8].

WOOD FOAM is a sustainable insulation material, manufactured through the grinding of wood into a puddy-like mixture and adding gas. This creates thermo-insulating foam that hardens due to natural fibres in the wood, making it as strong as conventional plastic foams. It has been developed by the Fraunhofer Institute for Wood Research[9].

THE BIOFORE CONCEPT CAR, produced by Finnish company UPM, utilizes wood pulp and plywood in its frame and runs on fuel made from bark, stems and branches. The car is designed to meet European crash and fire safety standards and can reduce a car's weight by 15 %. Though it is still a prototype, the technology is sound, and is being promoted to automakers[10].

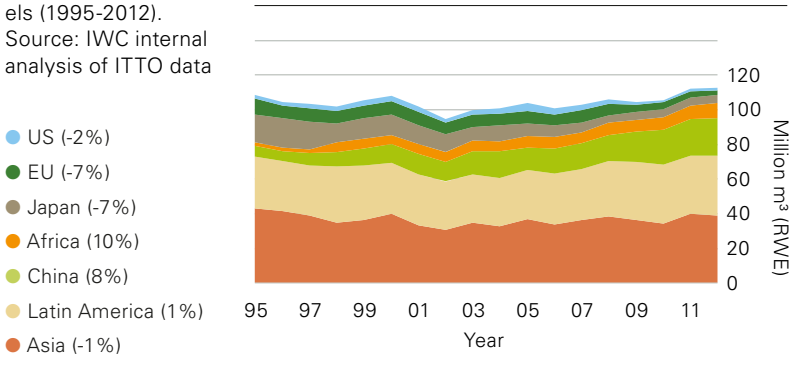
TROPICAL HARDWOOD DEMAND DYNAMICS

Tropical hardwood[1] comprises a substantial 11 % of the world's industrial log production today. This level has surprisingly remained stable over the past 17 years, implying that log production in the tropics has increased at the same pace as that from temperate regions. This article explores the drivers of this trend and provides thoughts on the future for tropical hardwood.

Growth in emerging markets drives tropical hardwood consumption

The largest consumers of tropical hardwood, apart from Africa, are the producing regions themselves (Figure 1). This is not surprising, as tropical hardwood in these regions is the main wood available and is used for a variety of purposes, such as construction, flooring, and furniture. Annual GDP growth rates[2] for Africa, Asia and Latin America[3] have been 4.7, 5.6, and 3.1 % respectively (CAGR[4]) since 1995. This economic development has translated into a further increase in tropical hardwood consumption (Figure 1), with the exception of Asia.

Figure 1
Consumption of tropical sawnwood and wood-based panels (1995-2012). Source: IWC internal analysis of ITTO data



Domestic supply constraints evident in Asia

Although a significant share of tropical hardwood is transacted in informal markets, implying underestimated reporting, there are indicators that support the notion of Asia's declining consumption, depicted in Figure 1. In particular, Asia's average import price for tropical hardwood has increased by 75 % since 1998. This indicates that the availability of local tropical hardwood in Asia is dwindling. Conversely, in Latin America and Africa prices have actually declined over the same period. This price increase has rendered the sourcing of wood from tropical forests as uncompetitive for the Asian forest industry. Testament to this is the gradual decline in Asia's tropical sawnwood and wood-based panel production, which has dropped 1.4 % annually (CAGR) since 1995 (the equivalent of 14 million cubic metres). This decrease in production is primarily attributed to loss of export shares to other low-cost wood producers. With Asia's population growth and economic development expected to continue, supply constraints are likely to intensify, meaning even higher tropical hardwood prices. This, in turn, will encourage further substitution to cheaper wood from local plantations and other regions.

[1] Non-coniferous tropical hardwood for industrial uses, grown between the Tropic of Cancer and the Tropic of Capricorn
[2] USDA International Macroeconomic Dataset
[3] Latin American tropical wood producers: Bolivia, Brazil, Colombia, Ecuador, Guatemala, Guyana, Honduras, Mexico, Panama, Peru, Suriname, Trinidad and Tobago, Venezuela.
African tropical wood producers: Benin, Cameroon, Central African Republic Congo, Côte d'Ivoire, Democratic Republic of the Congo, Gabon, Ghana, Liberia, Mali, Mozambique, Nigeria, Togo
Asian tropical wood producers: Cambodia, Fiji, India, Indonesia, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand, Vanuatu
[4] CAGR: Compound Annual Growth Rate
[5] Roundwood equivalent adjusted
[6] Pairwise correlation between Chinese and European import price change (in %) was 0.7 between 2000 and 2012.
[7] Fordaq: The timber network

China fills import gap created by financial crises

The international market for tropical hardwood used primarily in decorative products, such as furniture and flooring is a significant driver of demand. Approximately 24 % of global tropical hardwood production is exported (16 % as sawnwood and wood-based panels[5] and 8 % as unprocessed logs). Due to the financial crises in Europe and the US and economic development in Asia, trade routes have changed. The traditional end markets of Europe and Japan, have been surpassed by China, now the largest importer of tropical hardwood in the world (Figure 2).

Tropical hardwood prices remain stable

World prices for tropical hardwood have remained fairly robust despite a fall in demand from mature markets (Figure 3). In particular, the correlation between European and Chinese import prices for tropical sawnwood indicates the presence of competition, despite lackluster European demand[6]. The current market is supported by Chinese demand where the declining European market has mitigated price increases, but not enough to cause a drop. Anecdotal evidence suggests that European buyers are experiencing difficulties in getting price reductions, as sellers have the opportunity to divert their wood to other attractive markets to obtain better prices[7].

Price premiums have been expected for legally produced tropical hardwood, as producing regions are renowned for informal market transactions; and thus tropical hardwood originating from responsibly managed forests is in low supply. In 2008, the US implemented the Lacey Act, which criminalizes illegal import of wood (including tropical hardwood), and in 2013, Europe followed with the EU Timber Regulation (EUTR) that requires wood legality to be documented. Despite the increased demand for responsibly sourced tropical hardwood, higher prices remain to be seen due to recent implementation of the laws and lingering economic turmoil, which continues to influence demand.

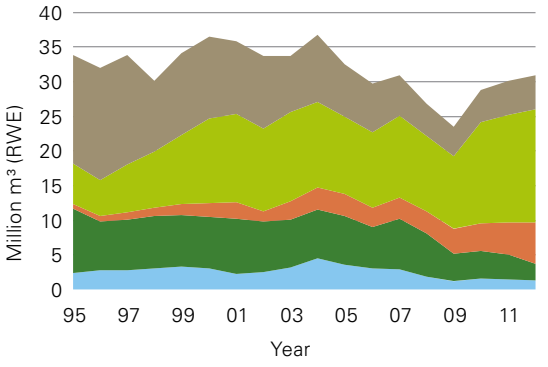


Figure 2
Net import of tropical hardwood (1995-2012). Source: IWC internal analysis of ITTO data

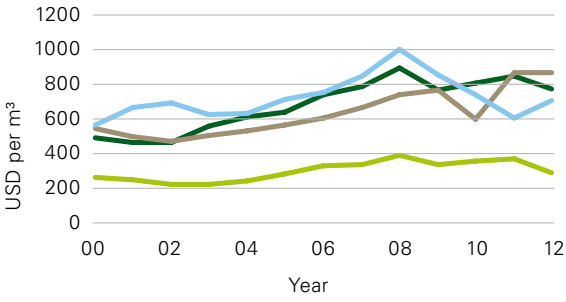


Figure 3
Tropical sawnwood import prices (2000-2012). Source: IWC internal analysis of ITTO data

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Price increase and substitution for cheaper plantation species expected

In conclusion, several factors support tropical hardwood demand and prices. In Asia, a dwindling low cost resource will probably drive up domestic prices further, supporting wood imports and substitution into domestically produced wood plantation species, like acacia and teak. Export markets are likely to see added competition for tropical hardwood, in particular from natural forests, with physical and/or aesthetic qualities superior to plantation grown timber. This will be supported by Asia's rising middle class, a rebound in mature market economies, and increased focus on legality (Lacey Act and EUTR) that favor certified tropical hardwood – though it is uncertain when these dynamics will play out together.

High-end garden funiture made from Burma teak

IWC WELCOMES NEW EMPLOYEES

Petya Dimitrova joined IWC in November 2013 as a Client Relations Assistant. Her main role is to support IWC's Portfolio Management team by handling client related requests. Petya's responsibilities include coordination of and assistance on clients' enquiries, client reporting and communication, as well as back office support. Petya holds a MSc in International Business and a BSc in Economics and Business Administration from Aarhus School of Business, Aarhus University. Prior to joining IWC, Petya worked at Østerbro International School in Copenhagen as the lead for Marketing and Communication.

"IWC provides best-in-class forest investment services to institutional investors and an attractive working environment to its employees. My ambition is to ensure utmost precision and quality when servicing our clients and to bring efficiency to IWC's internal work flows when handling client related requests."

Thomas Bentzen joined IWC in November 2013. As a Financial Analyst in the Due Diligence team, Thomas' responsibilities include the financial analysis of new investment opportunities and understanding the financial models and assumptions behind the managers' underwriting criteria. Thomas holds an MSc in Finance and Accounting from Copenhagen Business School. Before joining IWC, Thomas spent a year at Nordea Life and Pension and more than five years at FSP Pension (now AP Pension) working with financial analysis, financial modeling and performance evaluation.

"One of the great things about being at IWC is the cultural diversity among the dedicated professionals working here, that not only makes your day more interesting, but also gives you a better understanding of the people behind potential investments all over the world."

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