DASOS CAPITAL
Sustainable Timberland Investment

Current and Emerging Timberland Investment Market Prospects

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CURRENT AND EMERGING TIMBERLAND INVESTMENT MARKET PROSPECTS

Executive Summary

Over the last two decades, the amount of investor capital placed in timberland has grown rapidly to USD 70-85bn worldwide. Investors have been attracted to this asset class because of strong historical returns, a low correlation with stocks and bonds, protection from inflation, and renewable nature of the asset.

In the long-term and adopting a global perspective, the timberland market fundamentals are sound. The following **megatrends create a favourable investment environment** for this asset class:

- shift **towards a biomass-based economy** from the traditional fossil-based society, driven by climate change policies and reduced stocks of traditional energy sources
- growing economic importance of emerging markets with China and India at the forefront
- **continuing population growth with most of the growth in developing and emerging countries**; world population will continue to grow by 1.2% p.a. from 6.7bn today to some 9bn in 2050, when an estimated 90% of global population will live in emerging countries

The demand for paper in the USA, Western Europe and Japan is stabilizing due to demographics and spread of modern information and communication technology. The reduced demand for pulpwood in developed markets will be more than offset by **rising demand for wood-based bioenergy** and mechanical forest industry products used e.g. in construction due to their environmental benefits. At the same, **wood industry is quickly transforming into high-tech bio-combine industry** that integrates forest products with heat, fuel, electricity and bio-chemical product production. These developments combined with **rapid demand growth for forest products and bioenergy in the emerging markets** and **carbon sequestration services worldwide** imply increasing demand for forest assets**.** At the same time, the supply of wood from existing forest lands is declining.

Consequently, over time forests will become an increasingly scarce resource, resulting in **positive long-term price development and incentives to expand the timberland investment universe**. An estimated 45-55 million ha of new industrial planted forests will be needed equalling investments in the range of EUR 90-110bn in the coming two decades. The envisaged restructuring of both industrial and state forest ownership and investments into new assets outside the United States will provide investors in Scandinavia and rest of Europe with excellent opportunities to diversify their investments.

Timberland as an alternative, sustainable investment is expected to continue offering good risk-adjusted returns, diversification benefits and a good vehicle to preserve capital. In many markets, timber still remains a relatively inefficient asset class in which it is possible for active managers to generate significant additional returns. Further, current economic downturn has opened a window of opportunity for investors to enter this asset class at favourable valuations.

In future, timberlands will be increasingly valued for the ecosystem services they can provide in addition to generation of revenue from harvesting. For investors interested in exposure to environmental (forest) assets, carbon policy developments will create new complementary investment models to traditional timberland investment, or an entirely new carbon asset class. Assets capable of superior investment returns can be acquired, while retaining the underlying real forest asset as a backstop against risks in the emerging ecosystem services markets.

1. Timberland Investment as an Asset Class

1.1 Evolution of Timberland Investing

History of Timberland Investing

Business opportunities for timberland investment have traditionally been driven by

- the market prospects for forest industry and wood,
- the need to restructure forest ownership, and
- introduction of efficient investment platforms.

The main drivers for changes in timberland ownership are the companies' need to concentrate on their core businesses, bolster their balance sheets, enhance shareholder value, and improve liquidity. In the "traditional" divestment model, the company maintains access to the fibre resource through long-term timber sales agreements with the investors buying the assets. Institutional investors on their part drive the change by seeking investments in alternative asset classes to diversify and reduce risks of their investment portfolios.

Prior to the 1980s, vertically integrated forest industry companies owned most of timberland properties in the United States. In 1974 the Employee Retirement Income Security Act (ERISA) was introduced to encourage institutional investors to diversify their investments. Ownership of timberland provided one opportunity for diversification. During this same period, forest products companies began to evaluate the strategic role of their timberland holdings and saw potential in selling their timberland, with the proceeds being invested in expanding wood-processing to meet the increasing demand for industrial forest products.

Pension funds and other institutions with vast amounts of capital, and a legal mandate to diversify their investments, became logical buyers of this timberland while timberland investment management organizations (TIMOs) emerged to manage the assets. Currently there are about 20 TIMOs in the United States and they manage timberland investments of around USD 50bn (Mortimer 2009).

Timberland Investing Is Becoming More Global and New Return Drivers Are Emerging

The majority of (institutional) timberland investments are in the United States but the similar development is now taking place in Europe and the rest of the world. American TIMOs started expanding their operations outside the United States some ten years ago focusing first on Australia and New Zealand. Institutional investors now own timberland also in Argentina, Brazil, Chile, Panama, Uruguay, Malaysia, Mozambique, South Africa and Swaziland as well in Europe (Finland, Estonia, Latvia, Romania and Sweden).

Tornator in Finland and Bergvik Skog in Sweden are examples of successful large-scale industrial forest asset divesting in Europe. They are also examples of an emerging trend where the change in accounting standards (introduction of IFRS) is partly driving the ownership change. Since in many cases current balance sheet values for timberland assets have been lower than their fair values, the accounting reform has generally resulted in larger balance sheet values for timberland assets, which as a result, translates into an incentive for timberland asset spin-offs.

Globally, only a small minority of timberlands is so far owned by institutional investors. The International Woodland Company (2009) estimates that the investable and leasable forestland can be worth USD 480bn globally while currently assets under TIMO management amount to an estimated USD 70-85bn. New players such as Dasos Capital, International Forest Investment Advisors (IFIA), Cambium, the Forest Company, New Forests and Phaunos have entered the market offering institutional investors access to more diversified timberland portfolios. Geographic diversification of timberland investing enables offsetting risks associated with a specific region.

During the last ten years, the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at combating global warming, has created new timberland investment opportunities driven by markets for (forest) carbon credits. New investment products have been developed and are being developed that link sustainable forest management with carbon sequestration services, biodiversity offset products, payments for conservation and landscape services, and other environmental services provided by forests.

Role of the private sector is increasing

State sector has been globally major forest owner with stake of 86%. The private sector initiative is driving the establishment of new forest assets, especially in the capital scarce emerging market. The increasing role of the private sector is pronounced by the ongoing commoditisation and "privatisation" of environmental services from forests through creation of markets for environmental externalities such as biodiversity services and carbon mitigation.

Global Restructuring of Forest Industry and Shift of Production Closer to Growing Markets Create New Timberland Investment Opportunities

The emergence of global timberland investment is taking place alongside of a major structural change in global forest industry. Demographic changes and rapid economic growth in emerging countries are driving the global demand for paper and board and also other forest products. Modern information and communication media and changing consumption patterns are reducing the demand for paper (especially newsprint) in countries such as the United States and Japan (see graph below).

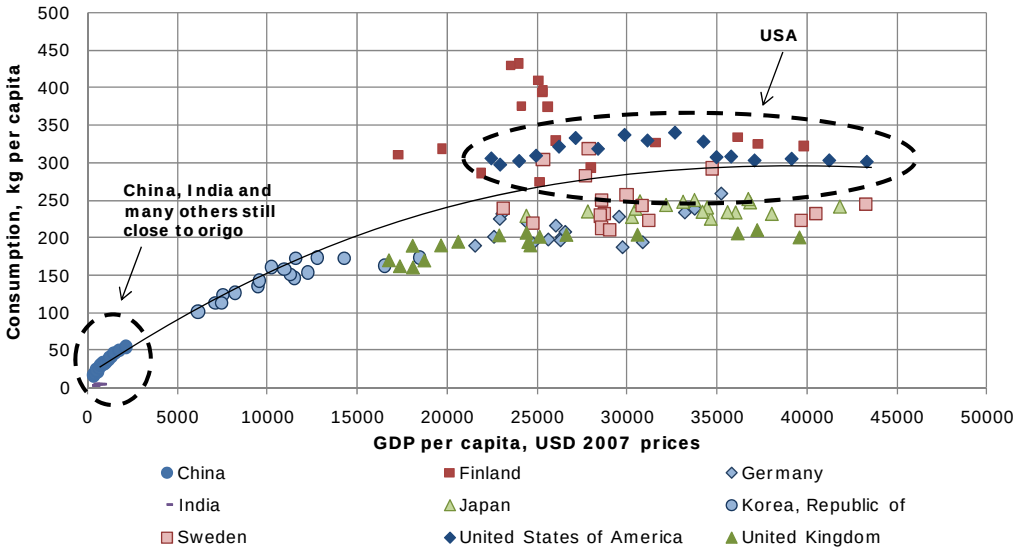

Figure 1 GDP and Paper Consumption Per Capita 1990-2006 for Individual Countries

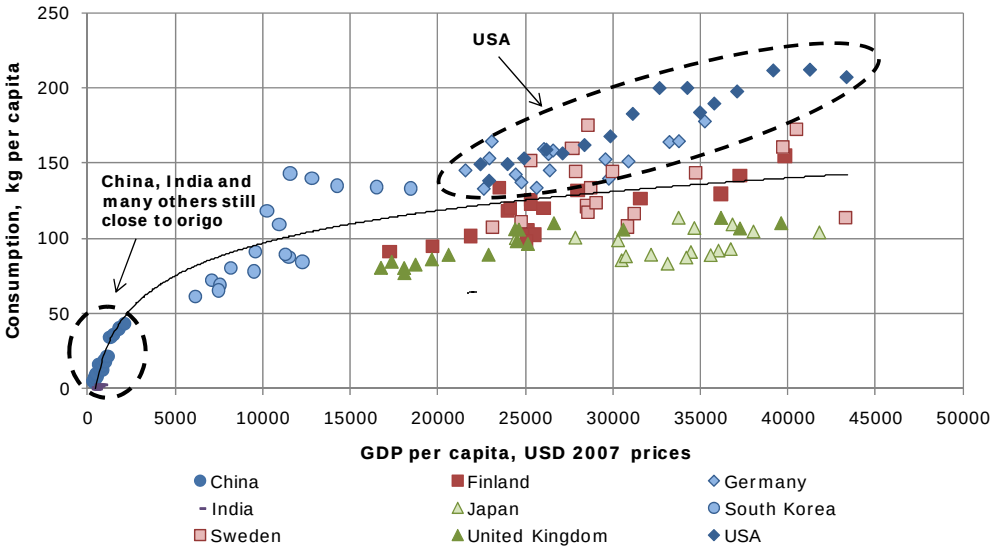

Figure 2 GDP and Wood-based Panel Consumption Per Capita 1990-2006 for Individual Countries

However, per capita paper and board consumption is only 44 kg in China and less than 10 kg in India while it is more than 300 kg/per person in the United States, suggesting a huge demand potential in emerging countries as they develop. The same applies to sawnwood and panel products (Figures 1 and 2) whose demand prospects are good both in developed and developing countries. These products are being used increasingly in construction due to environmental reasons such as: renewable nature of the raw material, low fossil energy needed to manufacture wood products, and carbon storage capacity of wood-based building materials and furniture.

Long-term economic growth is projected to be 3% p.a. in Russia and Brazil and 6% p.a. in China and India (EIU 2009). Population growth is the fastest in Africa, Asia (excluding Japan & China) and Latin America. In 2050 an estimated 89% of people will live in these countries (UN World Population Prospects 2006).

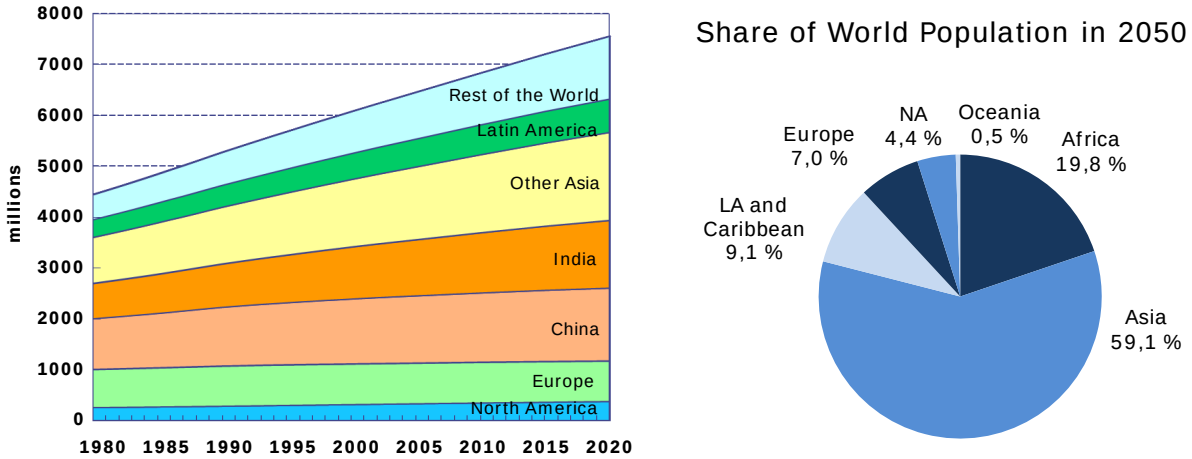

Figure 3 World Population Growth 1980-2020 (left) and Estimated World Population in 2050 by Region (right) Source: UN World Population Prospects 2006

Since consumption of paper, wood-based panels and sawnwood - and correspondingly of roundwood - are driven by the GDP and population growth, forest product consumption is predicted to leap in emerging countries during the next decades. E.g. long-term paper demand is forecast to increase 4.1% p.a. in emerging markets while it is predicted to decline slightly in the USA and Japan (see Figure 4).

Increasingly, paper will be produced where the market prospects are best and pulp will be produced close to the fibre source. Emerging countries offer best long term market prospects for paper and wood products and good growing conditions for fast-growing plantations, so it is not surprising that both industrial production and fibre production are shifting increasingly to Latin America and Asia. Huge plantation investments are needed in these regions to meet fibre and log requirements of the new mills.

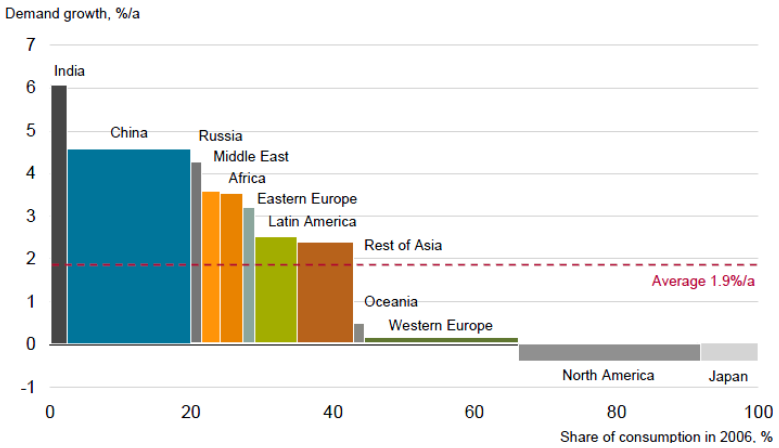

Figure 4 Long-term Paper and Paperboard Demand Growth by Region through 2025. Source: Pöyry 2009

While the conventional wood uses, such as paper, paperboard and sawnwood, will maintain their position as the most important forest industry products, the whole field of wood use is broadening. Forest industry is transforming itself into integrated production of bioenergy, biofuels, biochemicals, edible proteins and new composite wood products in addition to traditional industry products (Figure 5).

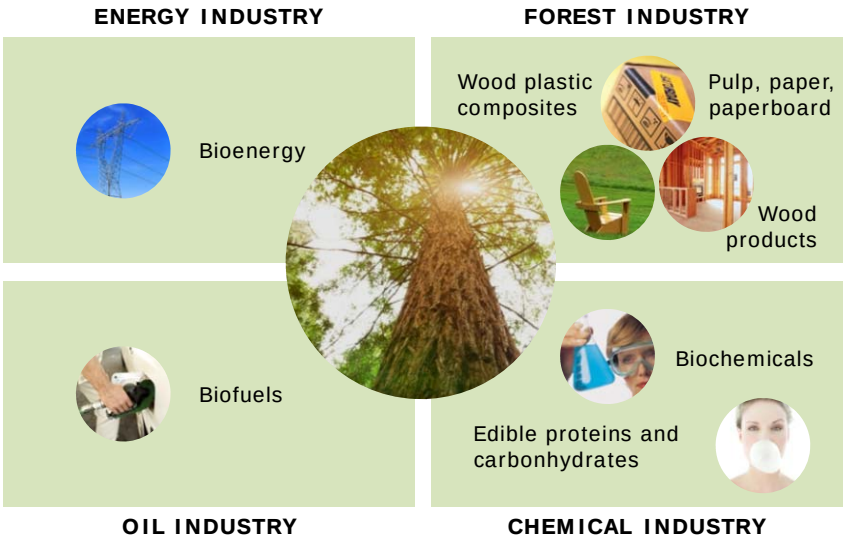

Figure 5 New Map of Wood Use

Bioenergy and biofuels have significant potential in increasing wood demand. Development of wood-based panels will promote wood building in both residential and commercial sectors. New innovations, such as biochemicals for the protection of goods or health, will not necessarily have significant impacts on total volumes of wood demand but they will improve the competitiveness of forest industry, diversify their revenue sources and bring additional income. In this way, forest industry's capability to pay for wood is enhanced, which is good for timberland investors.

1.2 Timberland Investment Characteristics and Sources for Return

Key Features of the Asset Class

Institutional investors have been attracted to timberland because of strong historical returns, a low correlation with stocks and bonds, protection from inflation, and renewable nature of the asset. Institutional investors especially benefit from timberland assets as they strive to manage their asset portfolios and maintain necessary exposure to uncorrelated risk adjusted returns. Timberland is commonly placed in the real estate portfolio, or in an alternative investment portfolio. Some larger institutional investors may also place timberland in a natural resource allocation. With its long investment horizon (up to 10 years), timberland is attractive asset to match the long-term nature of pension funds, and endowment and foundation spending requirements. Timberland returns are driven by three major factors, which are:

- biological growth and in-growth,
- changes in timber product prices, and
- changes in land prices.

Biological growth is by far the most significant return driver and it usually accounts for 65-75% of all returns (Mortimer 2009). The returns from biological growth can be further increased by better management. The effect of biological growth on timberland return comes from two sources; when the tree grows volume it also turns into higher value products (in-growth). Above all, the biological growth is independent from macroeconomic conditions or financial market performance.

The rest of the timberland return is more dependent on external factors. However, timber sales can temporarily be postponed if timber prices fall down. Land price changes usually account for a rather small portion of the total timberland investment return. However, increasing competition for land to be used for agriculture and bioenergy production, and recreational use, as well as for forestry, can provide major upside potential based on land appreciation.

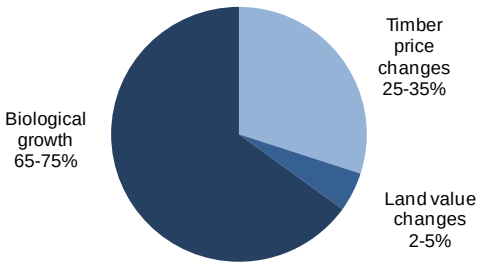

Figure 6 Historical Sources of Timberland Return. Source: The International Woodland Company 2009

Higher and better uses (HBU) of acquired forests can often provide complementary revenue to timberland investors. In the United States, it has been common to rationalize the management of forests and sell or lease part of the asset for hunting or holiday use, or get revenue from conservation easements. The American Plum Creek has estimated that possibly up to 21% of its total timberland assets could eventually be allocated to HBU and conservation.

Other key beneficial features of timberland investments include *negative or very low to zero correlation with other assets* (Lundgren 2005, Lutz 2004, Carroll 2003, Binkley et al 2001), which brings diversification benefits (Figure 7). This special feature is mainly derived from biological growth factor and timberland owner's ability to postpone timber sales during the times of lower wood prices. Diversifying a portfolio with timberland investments increases returns and decreases risk, or in other words helps achieving a more efficient frontier compared to an investment portfolio or real estate portfolio (Hancock 2003) that excludes timberland investments.

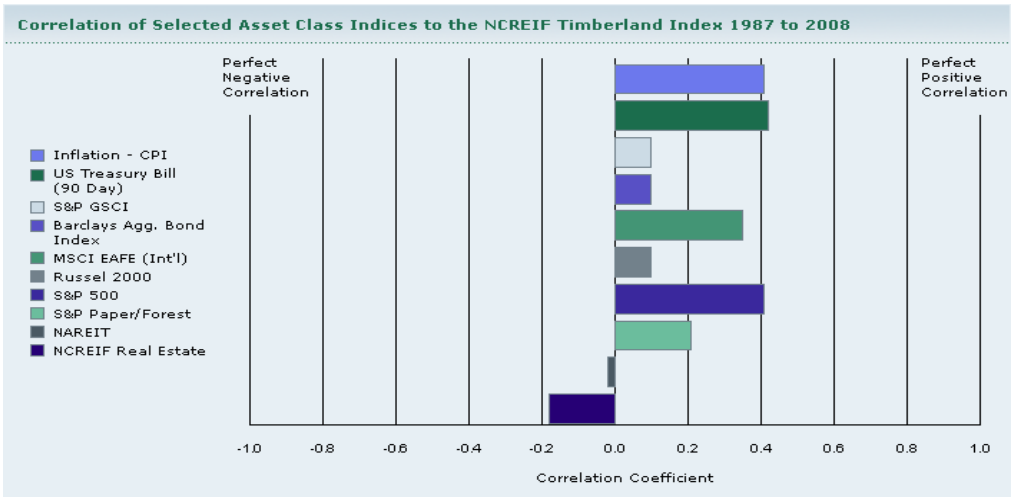

Figure 7 Correlations of Selected Asset Class Indices to the NCREIF Timberland Index 1987 to 2008. Source: Campbell Group 2009

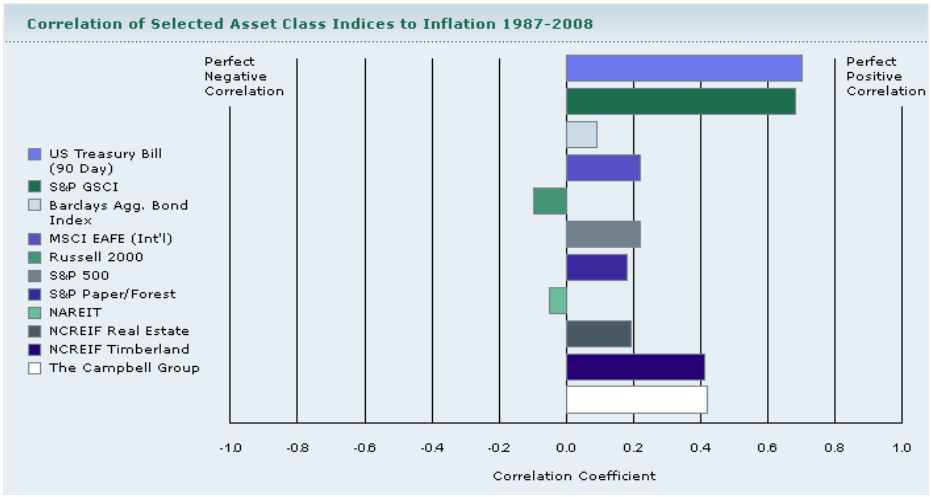

Figure 8 Correlations of Selected Asset Class Indices to Inflation 1987 to 2008. Source: Campbell Group 2009

In addition, timberland appears to *correlate positively with inflation* (Figure 8) especially over longer periods (Lundgren 2005, Lausti 2004, Binkley et al 1993). Therefore timberland investments can to some extent be used as *a hedge against inflation*. This is also supported by a study made by Lutz in 2007, which concluded that a *geographically diversified timberland investment* acts as an inflation hedge.

Historical Timberland Performance

Historically timberland investments have performed well. NCREIF Timberland Property Index, which has monitored private timberland investment returns in United States since 1987, has yielded an annualised rate of return of 14.6% in 1987-2008. As Figure 9 shows, timberland returns are competitive among a variety of asset classes.

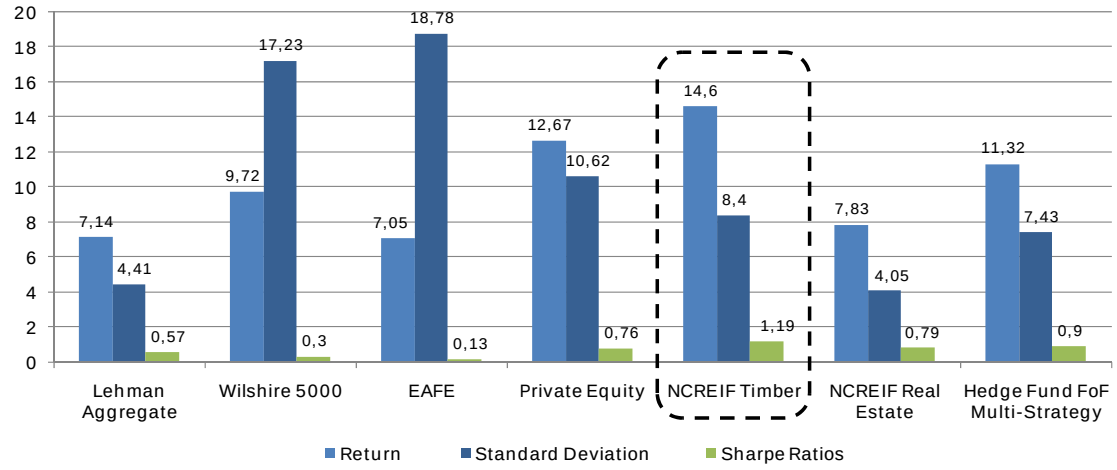

Figure 9 Annualised Rates of Return by Asset Class 1987- 2008. Source: Mortimer 2009

The current economic turmoil has also influenced timberland asset class albeit less than other assets. Judging by the performance of the US NCREIF Timberland Index, timberland assets delivered a 9.5% return in 2008, which is clearly below the historical average but still an attractive return compared to the performance of other asset classes during the financial crisis. In the short term, the returns in the US timberland market are expected to decline because of reduced demand for forest products and declined wood prices and inflated asset prices.

1.3 Sustainability Features of the Timberland Asset Class

Sustainable Forest Management

The renewable nature of this asset class combined with limited energy use provides good investment opportunities for those investors that *place socially responsible investment (SRI)* high on their agendas. Natural management in commercial forests based on the multiple-use concept can combine sustainable commercial wood production with the delivery of outdoor recreation services and conservation of biodiversity as well as protection of soil and water resources.

Forest plantation development can be done sustainably e.g. applying a *mosaic concept* that is based on conserving and also rehabilitating valuable natural habitats within the entire management area. In the

mosaic plantation concept it is possible to integrate sustainable wood production and environmental conservation while affording local communities with adequate natural forests, as source of timber and non-timber forest products and services, and land for livelihood. *High conservation value forests (HCVFs)* can be set aside to protect biodiversity and ecological and social values in the forest plantation landscape. Plantations are increasingly established to grow more valuable wood, e.g. teak, that substitute for logs from natural forests, and are used to manufacture furniture, flooring, etc.

Development of environmentally and socially sustainable commercial plantations can also take pressure off from the remaining natural forests especially in the tropics. The wood demand is estimated to grow on such a scale in Asia, Latin America and Africa that unless wood production is intensified the remaining natural forests will be under increasing pressure. Plantations can also be used as a buffer zone to protect natural forests.

Timberland Sustainability Performance Can Be Measured

In case of e.g. stocks or private equity, there are major challenges in demonstrating sustainability. In fact, there is no industry standard but various indices have been developed to measure the degree to which companies address the social and environmental issues and rank companies in their respective sectors.

In case of forestry, investors can monitor the sustainability performance based on internationally agreed standards certified by independent accredited organisations such as SGS. Forestry has been a pioneering sector in developing globally and regionally applicable criteria and indicators for *social, environmental and economic dimensions of sustainability* to measure how management succeeds delivering results without compromising the quality of life of future generations.

Hence, it is possible for investors interested in promoting sustainability to rely on annual internationally accredited third-party assessments of individual investment's compliance with requirements of sustainable forestry. Examples of such internationally accredited schemes are Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC). In addition, there are regional and national certification schemes that are compatible with the earlier mentioned international schemes such as the Sustainable Forestry Initiative (SFI) in the United States and CERFLOR in Brazil. At present, FSC certification system is most widely used globally as assurance that wood and paper products come from forests that meet strict environmental and social standards, but PEFC is also increasingly being used e.g. in Latin America in addition to Europe.

In addition, often linked to the above certification systems, it is possible to certify, using independent organisations such as SGS or Veritas, that the wood used in processing comes both from a legal and sustainable source. This type of "chain of custody" certification is commonly used e.g. by European forest industry as part of their quality assurance process and demonstration of corporate responsibility.

Wood Products Have Favourable Sustainability Features

The manufacture of processed wood products can promote sustainability in a number of ways, as long as the wood used in processing comes from a sustainable source. Forest biomass and the by-products from sawmilling, pulp and paper processing as well as waste wood are major sources of renewable energy in forest-rich countries. E.g. in Finland forest sector produces more than 70% of the consumed renewable energy (whilst total renewable energy accounts for 25% of total energy consumption in the country).

Wood, paper, paperboard and fibre packaging products can be recycled and reused many times over, substantially increasing the efficiency of raw material utilisation that in the first place has been based on

renewable, biological resource. Products that have reached the end of their lifecycle and biomass that is not suitable for processing can be used in generation of renewable energy.

"Green housing" is becoming increasingly common because of energy scarcity and climate change policies. Buildings, their construction and raw materials used in construction are a significant source of carbon dioxide emissions in developed countries. With various degrees of urgency, E.U. countries are moving towards requiring new homes to only use clean energy and have zero net carbon emissions. The United Kingdom mandates all new homes be zero-carbon by 2016. France and Germany are also in process of introducing similar standards. Real estate funds have already seen potential in these trends and have introduced funds specialised in "green buildings".

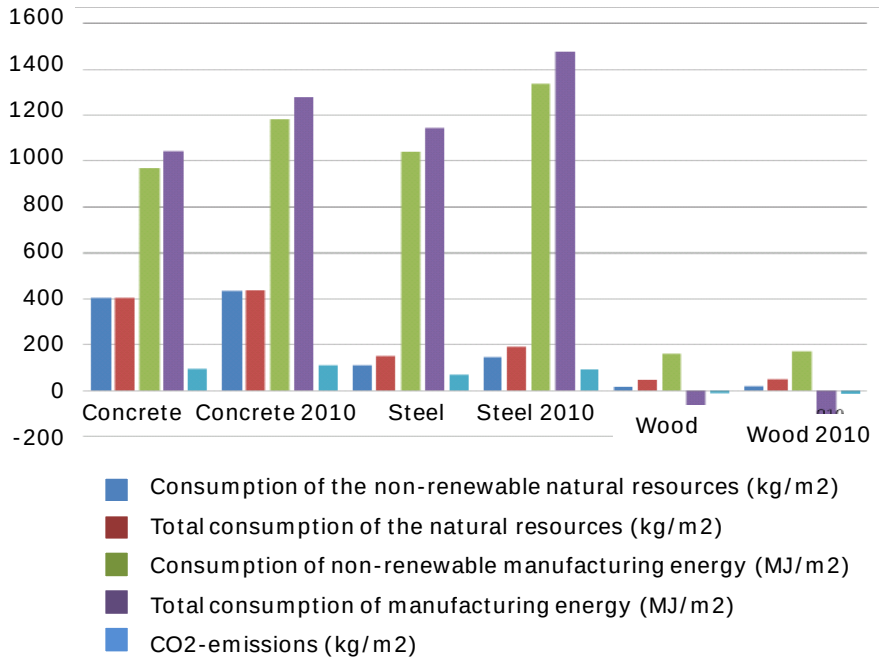

Figure 10 Environmental Impacts of Different Raw Materials in Construction in Finland in 2007 and 2010 after New Regulations Take Effect (Viljakainen 2009)

These developments will mean increased demand for wood. Wooden construction material (wood-based panels, sawnwood, structural beams, etc.) and wooden furniture store carbon. Simply, using timber in a building can reduce significantly its carbon load compared to an equivalent building made from concrete reinforced with steel. Further, at the same time one can reduce the use of natural resources and energy per constructed housing unit over the lifecycle. A recent research report (Viljakainen 2009) compared the environmental impacts of different raw materials used in construction and concluded that:

- the best way to reduce the environmental impacts caused by construction and the manufacture of building materials would be to increase the use of wood in construction wherever possible,
- increasing the use of wood would transform buildings into carbon sinks, whereas as building constructed using concrete and /or steel are sources of carbon emission,
- buildings using wood materials are much less energy intensive that buildings using competing raw materials.

Through expanding the area under sustainable management one can increase carbon sequestration while producing renewable products. Importantly, *timberland investments based on sustainable forest management have a positive carbon footprint.*

Global Environmental Sustainability Is Supported by Forest Investments

The creation of environmental markets is introducing *new return drivers for timberland investment based on demand for "commoditised" environmental services provided by forests*:

- forest carbon credits have the potential to provide significant upside to traditional timberland harvesting revenue model, though associated with some volatility due to great fluctuations of carbon credit prices,
- payments for other environmental/ecosystem services (PES) such as conservation of biodiversity or landscape.

Climate Change and Forestry

In the long term, the shift towards a biomass-based economy from the traditional fossil-based society, driven by climate change policies and reduced stocks of traditional energy sources, will only enhance the revenue generating potential of carbon sequestration services based on afforestation/reforestation (A/R) or avoided deforestation. The importance of forests derives from the fact that deforestation and forest degradation account for some 20% of total global greenhouse gas emissions. In addition to directly impacting the cash flows, climate change mitigation measures based on forest conservation can reduce the amount of land available for wood production and indirectly enhance the value of forest land and wood prices due to declined supply from natural forests.

The influential Stern Review on Climate Change (www.sternreview.org.uk) makes a strong case for investing in sustainable forest management to address climate change. Some of the main conclusions of this report are that:

- the benefits of strong early action on climate change far outweigh the costs,
- it is crucial to accelerate the move towards a low-carbon economy,
- act early on non-energy emissions – preventing further deforestation now will go a long towards reducing carbon dioxide emissions and would be cheaper than addressing the issue later on.

The London Accord is the largest cooperative project in the world on the investment opportunities in avoiding climate change. It carried out the largest ever future modelling of portfolios for climate risk and reward. According to the London Accord, investing in sustainable forestry and projects to avoid deforestation will be the two key strategies for investors seeking to stabilise their exposure to CO2 emission.

Biodiversity and Trading of Nature Values

Biodiversity and conservation are gradually being "commoditised" providing interesting long-term investment opportunities. Bio-prospecting rights, biodiversity-friendly products and biodiversity offsets are already providing revenue to progressive, pioneering investors. In the United States conservation easements have provided considerable upside for timberland management organizations (TIMOs) already for years. Under a conservation easement agreement e.g. a non-profit land trust or a government agency that wants to protect certain ecosystems pays a private landowner to manage his or her land sustainably to provide environmental services such as ecosystem protection, watershed management and scenery. (Katila and Puustjärvi 2004)

In Europe, nature values trading and biodiversity conservation programmes are under rapid evolution. Private forests owners can at present be compensated e.g. in Austria, Sweden and Finland for forest conservation, compensation levels reaching up to USD 1700 per hectare. The trend is to expand voluntary incentive programmes within the EU to encourage the private sector to produce non-timber benefits.

1.4 Summary of Demand and Supply Trends Influencing Timberland Returns

In the previous sections an overview of how timberland investment asset class is evolving and how traditional return drivers are complemented with new, environmentally driven ones.

The figure below summarises the future demand and supply trends and related drivers that influencing timberland investments. These impacts will be felt through both prices and creation of new products and services with revenue generating potential. As a whole, the long term market prospects favour timberland investments, e. g, real wood prices can be expected to develop favourably due to shifts in demand and supply balances. Furthermore, carbon and other environmental services will make an increasingly strong investment case. The growing need for bioenergy, and wood-based biomass, and carbon sequestration services also result in increasing demand for land under sustainable forest management. Opportunities for successful timberland investments arise globally, as the gap between demand and sustainable supply of wood and environmental services provided by forests increases.

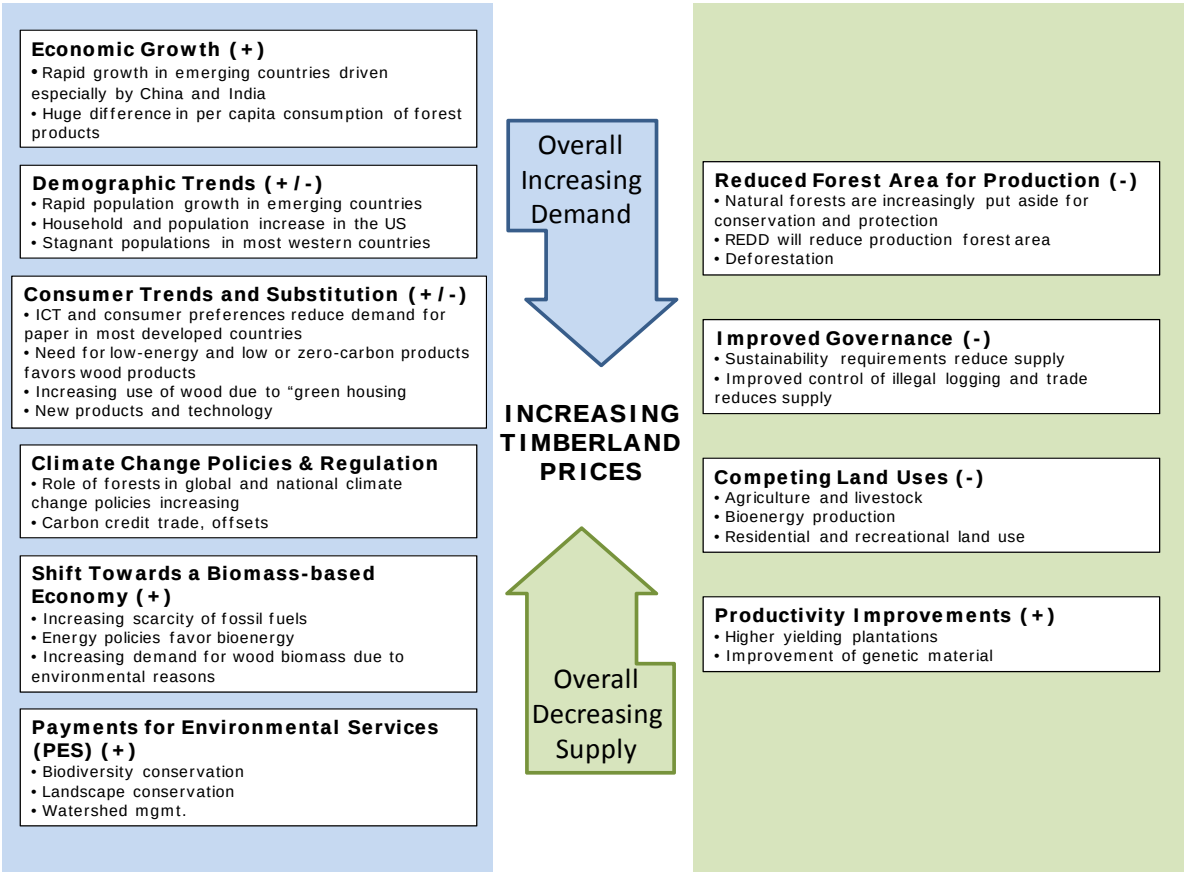

Figure 11 Demand and Supply Trends and Related Drivers Influencing Timberland Investments

2. Demand Prospects for Wood

2.1 Global Demand for Forest Products Is Still Increasing

Demand for forest products as a whole will be increasing globally with regional variations by product.

Pöyry expects the global average demand for paper and paperboard to increase in 2009 to 2025 by 1.9% per year with most of the growth in emerging markets and demand stagnating in developed markets due to substitution of electronic media for printed media (see Figure 1 in Chapter 1.1).

FAO on the other hand projects that consumption of various forest products will increase as follows:

- Sawnwood consumption will increase by 1.4% p.a. in 2005-2030
- Wood-based panels consumption will increase by 3.3% p.a. in 2005-20 and 2.9% p.a. in 2020-2030
- Paper and paperboard consumption will grow by 3.0% p.a. in 2005-20 and 2.7% p.a. in 2020-2030.

Demand for sawnwood and wood-based panels is growing both in developed and emerging markets. Wood products have good growth potential also in Europe and other developed markets.

FAO estimates that the global industrial roundwood production to supply raw material for processing must be increased by over 40% in 25 years, i.e. from 1.67bn m^3 in 2005 to 2.46bn m^3 in 2030 (Figure 12) amounting to an average annual increase of 1.6%.

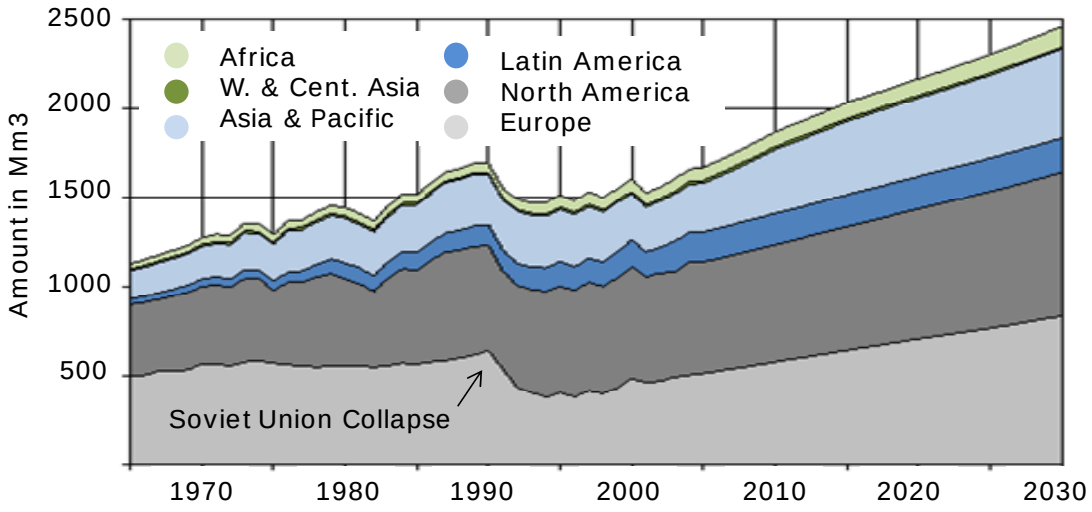

Figure 12 Global Production of Industrial Roundwood, 1965–2030. Source: FAO 2009, Unpublished Draft

2.2 Regional Trends: Emerging Markets Are Driving Global Demand

Wood fibre consumption will grow most rapidly in Eastern Europe, China and other emerging Asian markets while the demand in North America, Western Europe and Japan will stagnate. The same applies also to paper demand. Long term demand for paper will increase by 4.1% annually in emerging markets compared to stagnating, or even declining, growth in developed markets (Figure 1 in Chapter 1.1). Packaging board demand and production growth will be especially strong in the emerging markets.

Drivers for forest products demand in emerging markets are GDP and population growth, advertising, urbanization and exports. E.g. in *China* GDP growth has averaged 9% p.a. in last two decades which combined with the world largest population base translates into a demand boom for all types of commodities and products. *India* is most populated country after China with 1.14 billion people in 2008 and population is still growing annually by 1.4%. It is the 12th largest economy in the world is catching other countries rapidly with GDP growth averaging 7% p.a. India is in the process of becoming a new China, which will also have implications for forest products and wood demand in the region.

However, among the fast growing emerging markets, China is the definite “hot spot” of increasing forest products demand. Being already the third largest paper market in the world, China is expected to continue its substantial volume increase by 7% p.a. in the medium term and 5% p.a. in the long term (Barclays 2009). Domestically China is short of fibre and it has to import substantial amounts of wood fibre. Its domestic fibre supply potential is limited due to land scarcity, uncertain tenure and environmental issues. Consequently, China’s forest products imports tripled during 1997-2006, most of the imported forest products being roundwood and other raw material for processing. To satisfy the growing need for wood, investments are needed in their own plantations together with plantation investments abroad to supply fibre to Chinese industry from abroad.

Interesting timberland investment opportunities will arise in areas where the fibre resources are available and production is cost competitive, such as in Latin America, Asia and possibly Russia and Eastern and Southern Africa.

2.3 Impact of Business Cycles and Long-term Trends on Prices

Pulp and sawlog prices experienced one of the steepest price drops ever in late 2008 and early 2009 due to the biggest recession since 1930. Wood prices in most markets have been adjusting downward towards long-term trend prices from their highest ever peak prices.

As the global economy recovers and returns to growth after the slump, *real wood prices are expected to grow in the long term by an average annual rate of more than 1% as in the past*. In future wood prices will be supported by more diverse wood use as the demand for wood for bioenergy and biofuels increase and simultaneously the supply of wood is reduced because of the increase in forest conservation areas and reduced illegal logging. As is visible in Figure 13, the price decline has slowed and in the same markets prices are starting to move upwards again.

Timberland prices seem to follow wood prices with a delay of 1-2 years, but wood price changes are not fully transferred to timberland prices due to the unique characteristics of forestry; e.g. harvesting can be delayed during times of low prices. Around mid-2009 forest asset valuations have started declining albeit much slower than wood prices e.g. in Finland, Baltic countries and Eastern Europe where there are good

opportunities for timberland investment. The global recession has also brought distressed sellers to the market.

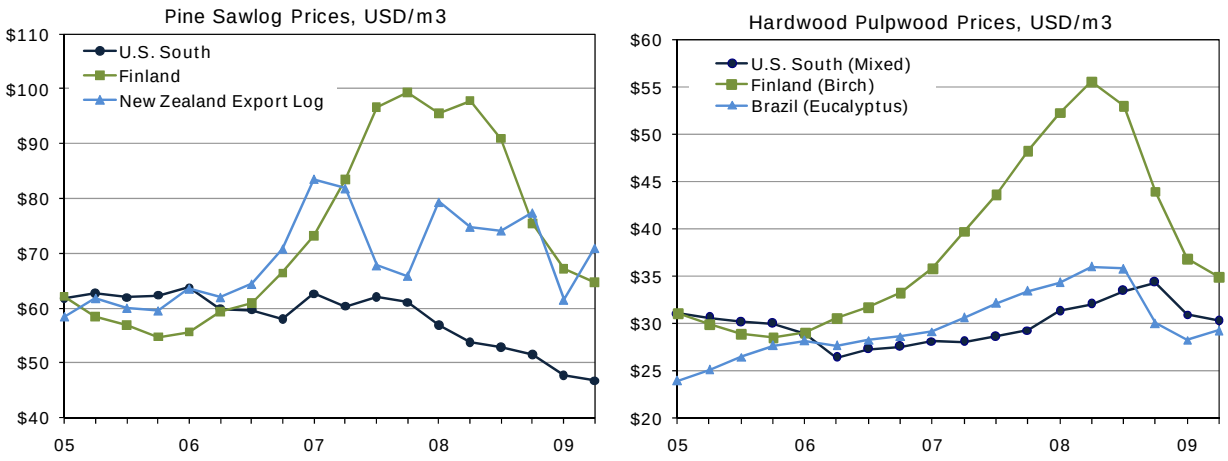

Figure 13 Pine Sawlog and Hardwood Pulpwood Prices Q105-Q209. Source: RISI 2009

3. Bioenergy and Forestry Carbon as Increasingly Important Drivers

3.1 Demand for Wood-Biomass for Energy Production Is Increasing

Renewable energy policies are creating new demand for wood and timberland worldwide. In addition to renewable energy targets, increasing oil and gas prices and worries over high import dependency of fossil fuels are creating interest in wood biomass as an energy source.

Governments around the world are setting targets for renewable energy sources. The European Union has committed to reduce its overall emissions by 20% below 1990 levels and to increase the share of renewable energy sources to 20% of all energy output by 2020. Each member state will contribute according to its wealth and the national targets vary from one member state to another. Around two-thirds of the renewable energy is expected to come from biomass, the majority of which is wood.

In 2007, the share of energy from renewable energy sources was 6.5% of final energy consumption in EU27 and wood accounted for almost 54% of this amount (Figure 14). The projected impact of EU 2020 policy on wood supply and demand balance is significant; *replacing one percent of total primary energy consumption in EU 27 by energy from wood biomass would require over 90 million cubic meters of wood. Such amount of wood equals to approximately one-eighth of all the EU wood supply, including supply from forests, residues, recovered wood and co-products.*

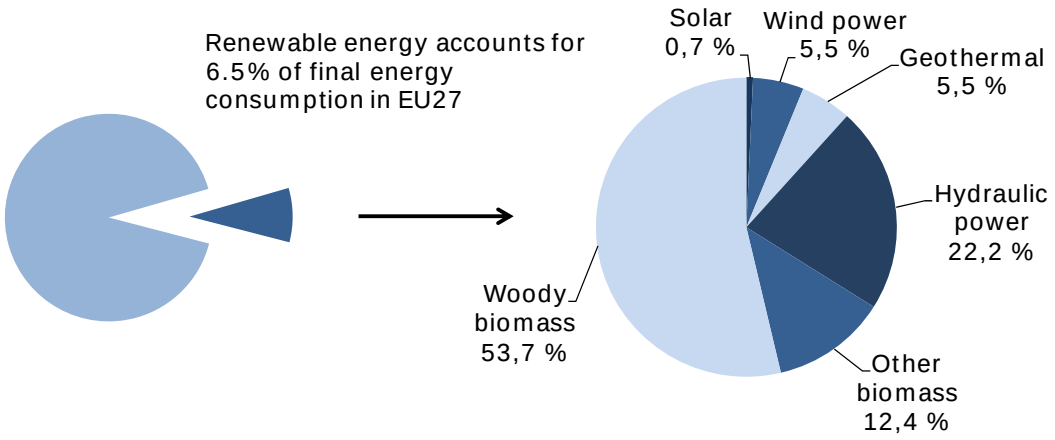

Figure 14 Product Shares of Renewable Energy Supply in European Union 27 in 2007. Source: FAO, UNECE

In the United States, President Obama's administration has emphasized their commitment to decrease emissions, fight climate change and promote the use of renewable energy sources. In addition, investments in renewable energy reduce the United States' dependence of foreign oil and create jobs that cannot be shipped overseas. Willingness to commit to these new environmentally safe policies is not limited to developed countries, for example China and India have reported their intention to favour renewable energies in their national energy policies.

Total wood demand in Europe will continue to increase because of growing energy use of wood, which offsets stagnating industrial wood use, as is illustrated in Figure 15.

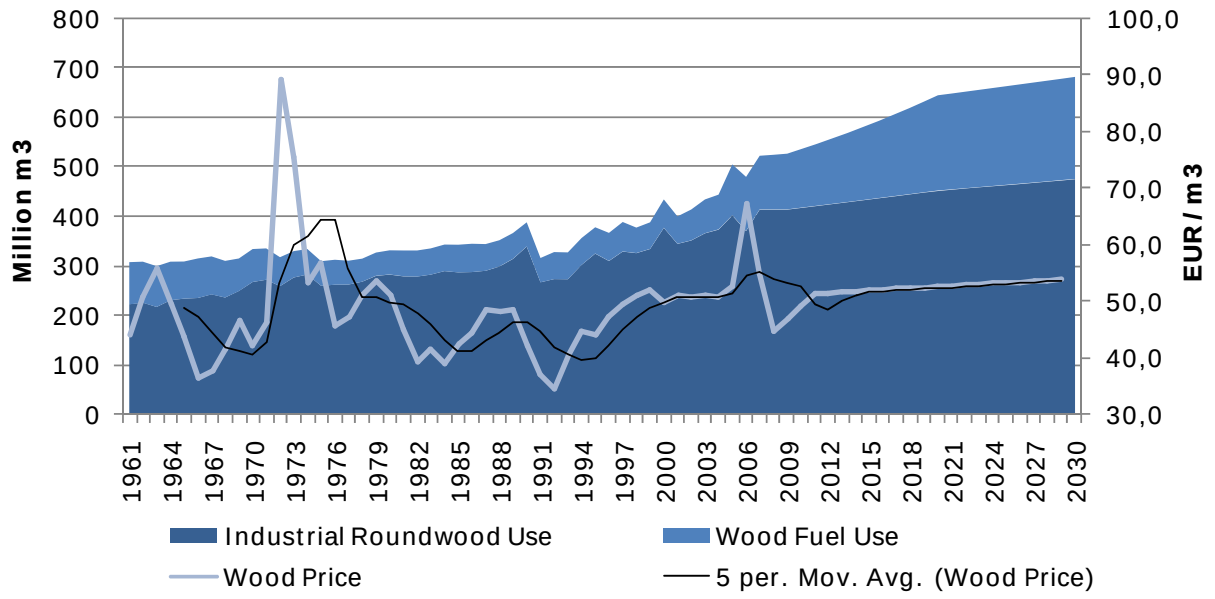

Figure 15 Wood Use Trends in Europe (excl. Russia). Prices Are in Real Terms Deflated to 2009 Prices. Source: FAO, Metla, Dasos

Wood Pellets

Europe is leading the rapid growth in the demand for wood pellets driven partly by the EU's target to produce 20 % of energy needs from renewable energy sources. Compressing wood waste and even potential fibre wood into pellets offers a climate-friendly alternative to fossil fuels.

Wood Resources International forecasts that the demand for wood pellets in Europe will continue to grow at 8%-10% annually in future. Sweden alone used almost 2 million tonnes in 2008. The United Kingdom, Denmark, Sweden, Germany, and Italy are expected to experience rapid growth wood biomass consumption. The wood pellet market is growing rapidly also in the United States.

Power Plants Based on Wood

In the United Kingdom, the government's renewable energy strategy assumes that by the end of this decade, one fifth of UK's total renewable energy consumption is to be met from wood biomass. More than twenty large-scale wood biomass plants (>50MWe) have been planned requiring a steady supply of wood biomass amounting annually even up to 30 million tonnes of (green) wood chips or 17 million tonnes of wood pellets. This would be more fibre than what is being imported annually by the entire Japanese pulp and paper industry. These new plants will increasingly, and almost totally, depend on imported pulpwood, wood chips and pellets.

Bioenergy Integration with Pulp and Paper

Bioenergy offers new business opportunities to the pulp and paper industry, which will also improve its wood-paying capability. Forest industry companies are entering into joint ventures and strategic alliances with energy and oil companies in order to increase energy production. The companies can also employ their existing capacity and know-how to control the energy wood procurement chain from forest to production site and all the way to distribution.

Mechanical Wood Industry and Bioenergy

Mechanical wood processing industry typically generates substantial volumes of wood residues such as bark and chips, which are excellent raw material for bioenergy. Depending on executed tax structure and incentives, mechanical wood processing sites have in many parts of Europe become major bioenergy production units with substantial potential for additional

In summary, forest owners, including TIMOs, can earn higher revenue from better wood prices because of increasing demand for energy wood. Bioenergy demand is expected to create a floor price for pulpwood in some markets. Sales of earlier uncommercial thinnings and also forest residues provide attractive supply side opportunities.

3.2 Increasing Amount of Biofuels Are Based on Forests

The present opportunities for additional revenue streams for forest owners are based on expansion of power and heat generation from wood biomass. The future prospects also include production of biofuels (diesel and ethanol) and biochemicals from wood. The commercialization of these biofuel production technologies is already in progress and several cooperation projects between forest and oil or energy industries have been announced, for example between Stora Enso and Neste Oil in Finland/Sweden, UPM and Lassila & Tikanoja in Finland, Weyerhaeuser and Chevron in the United States, and Moelven and Eidsiva Energy in Norway. Finnish Neste Oil is also investing over EUR 1.2bn in two 800,000 t/a palm oil-based renewable diesel plants in Singapore and Rotterdam. Motivated by the growing bioethanol market, the second largest European oil company Shell recently announced plans to build a joint venture with Brazil's biggest ethanol maker Cosan. If the plan is realized, Shell will contribute assets including 2,740 service stations and USD 1.93 billion of cash, whereas Cosan will provide USD 4.93 billion of assets, including plants able to process 60 million tons of cane a year.

The demand from wood-based biofuels is strongly supported by national targets for biofuel consumption around the world (Figure 16).

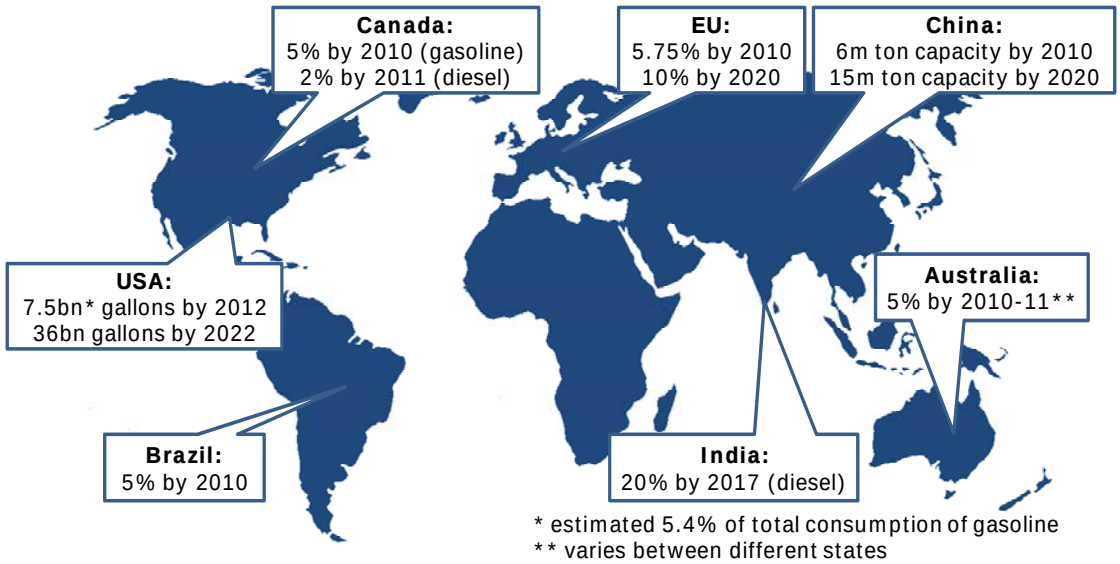

Figure 16 National Targets for the Use of Biofuels

Wood as a Feedstock

Biofuels can be derived from several different feedstock, such as barley, corn, sugar cane or palm oil, but wood is more viable option by almost any standard of sustainability or efficiency. For example the recent rise of crop prices due to bioenergy boom, which has worsened the global food crisis and weakened the position of the poorest of people, has showed that biofuel production from non food crops should be urgently promoted.

Types of Biofuels

There are basically two types of liquid biofuels, bioethanol and biodiesel. *Bioethanol* is produced by fermenting the sugar components of plant materials, e.g. sugar cane, sugar beets, wheat or corn, and it is most commonly used in USA and Brazil, where sugar cane ethanol market is already very mature. About 90% of new vehicle registrations in Brazil are so called Flexible Fuel Vehicles (FFV), which can run on regular petrol, pure bioethanol or a mixture of both.

Modest energy balance (primary energy needed to produce one unit of fuel in question) and implications to food prices by ethanol production from corn and other food crops has lead development to second generation cellulosic ethanol. It can be produced from wood or waste biomass, grasses or other non-edible plant parts. Large-scale production of cellulosic ethanol faces still some technical difficulties, but on the other hand cellulosic ethanol seems superior to any conventional fuels in terms of sustainability and efficiency. According to the U.S. Department of Energy, cellulosic ethanol has a fossil energy ratio of 10.3, whereas the ratios for corn ethanol and normal gasoline are 1.36 and 0.81, respectively.

In Europe, the most commonly used renewable fuel is *biodiesel*, which can be produced by transesterification of animal fats or vegetable oils. Production process from wood biomass to biodiesel is illustrated in Figure 17, showing how biomass is first converted into diesel wax in gasification plant and then into diesel in petrol refinery.

These so called Fischer-Tropsch biodiesel plants have significant fuel production potential. *In fact, two 200,000-tonne plants would be able to produce enough biodiesel to account for about 9 percent of road traffic fuel consumption in Finland, closely matching the EU biofuel target of 10% by 2020.* The two plants would require total of four million cubic meters of wood, i.e. 7% of the current average domestic wood use by the forest industries in the country.

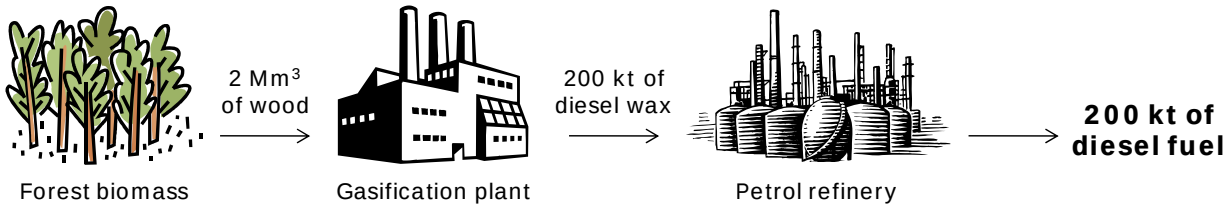

Figure 17 Fischer-Tropsch Biodiesel Plant Concept. Source: Laakso et al 2009.

Towards Third Generation Biofuels

In longer term, so called third generation biofuels from low-input and high-yield algae fuels are being developed. In terms of energy produced per hectare, algae is superior to any existing fuels but there are still many technical problems to solve before any commercial production of algae fuel can be started and

therefore it seems likely that the current biofuel targets must be reached by the help of first and second generation biofuels.

Wood-based Biochemicals

Wood is also a rich source of bioactive chemicals and biomaterials. To put it simply, trees live for a very long time and to survive from diseases and pests and to resist decaying over the long life cycle, trees contain high concentrations of protecting defence substances They have been created by natural evolution of millions of years. Many of these chemicals are stored in bark, which is not utilized in conventional wood refining processes. For example, tannins of bark are strong antioxidants and they are already utilised in many health-related applications. Xylitol, a natural sugar substitute preventing caries, in its turn can be extracted from birch or beech. Plant sterols in Benecol products are also derived from wood. Although these products will not become core business for any forest industry company, they do increase efficacy of wood use, offer natural options for synthetic chemicals and bring additional income for the companies and support their ability to pay for wood.

3.3 Market Opportunities Related to Carbon and Other Environmental Services

Forestry plays an important role in climate change mitigation due to forest's cost-effective potential (i) to increase carbon sequestration and act as carbon sinks, and (ii) to reduce greenhouse gas emissions through avoided deforestation and forest degradation. Deforestation and forest degradation contribute about 20% of global greenhouse gas (GHG) emissions, which explains the interest in investing into avoiding deforestation. In fact, forestry transactions were the first-ever carbon offsets.

There are two main types of carbon markets, regulatory Kyoto Clean Development (CDM) *compliance carbon markets* and *smaller voluntary carbon markets*. The former allows credits from afforestation and reforestation whereas voluntary markets provide a trading platform also for credits from *reducing emissions from deforestation and forest degradation (REDD).*

Importance of Voluntary Markets

According to the Ecosystem Market Place's "State of the Forest Carbon Markets 2009", the accumulated impact of carbon investments in both the voluntary and compliance market over the past 20 years covers already more than 2 million hectares of forests and has resulted in the capture of almost 70 million tonnes of carbon in trees. During the last three years the markets have matured substantially. The total historical market value of forest carbon credit transactions is estimated at some USD 150 million through the first half of 2009, of which 92% is estimated to arise from the voluntary market

The international regulated carbon markets transacted in 2008 4,090 million tonnes of carbon dioxide equivalent ($MtCo_2$-e), valued at USD 119bn in total (State of the Voluntary Carbon Markets in 2009). Voluntary markets represented only about 2.9% of the volume of the regulatory markets and less than one percent of the value. However*, forestry and land use accounted in the voluntary markets for about 17% of the total while the corresponding share in the Kyoto compliance markets was only 1% in 2008* (Figure 18). Voluntary markets are also growing very fast, doubling in value in 2008 (State of the Voluntary Carbon Markets in 2009).

Voluntary carbon markets are growing in importance because they are more flexible (REDD credits allowed) and less bureaucratic than CDM-markets. They are growing very fast relative to the compliance

market. *Forestry offset credits grew faster than any other credit in the Chicago Climate Exchange reaching a 22% share in 2008.*

According the Ecosystem Market Place (2010), historically most forest carbon credits transacted have been sourced from afforestation and reforestation (A/R) projects (63%), followed by REDD projects at 17%, and Improved Forest Management (IFM) projects at 13%. In 2008, A/R remained the top sources at 53% while the role of REDD increased.

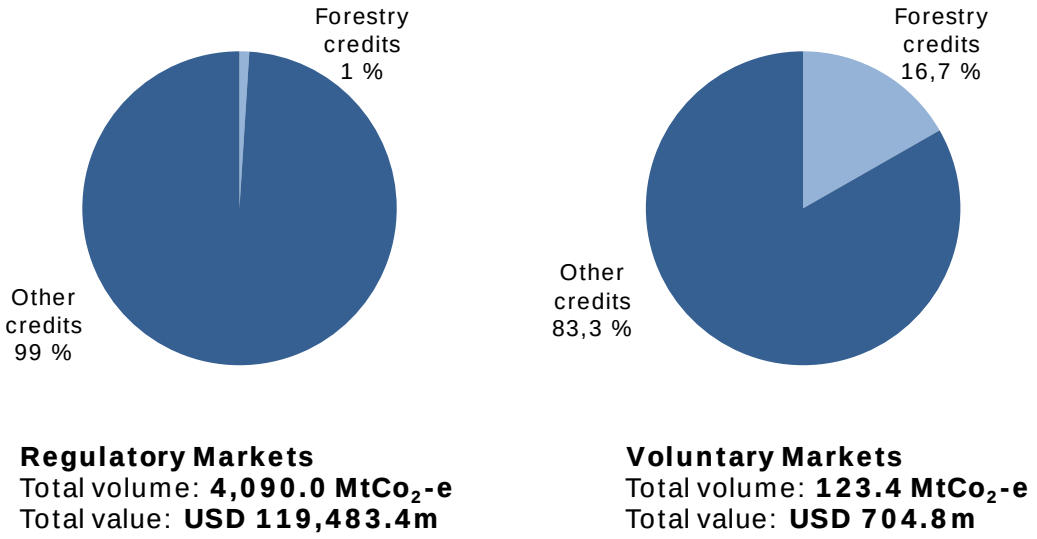

Figure 18 Share of Forestry Credits of Total Regulatory and Voluntary Carbon Markets in 2008. Source: State of the Voluntary Carbon Markets 2009.

REDD Is Becoming More Important in Climate-related Markets

REDD has major potential in climate change mitigation and it can help reducing the cost of achieving global climate change targets while providing revenue to forest owners. Analyses examining the cost of REDD activities indicate that alleviating deforestation is one of the most cost-effective ways to reduce emissions. In their conservative calculations, the Intergovernmental Panel on Climate Change (IPCC) estimates that *approximately 25% of deforestation emissions can be abated at a cost of much less than $20 per metric ton of carbon dioxide (tCO2). By comparison, UK's cross-party parliamentary Environmental Audit Committee (EAC) has projected 2020 carbon price at levels ranging from EUR 22 to EUR per tCO2.*

According to United Nations Framework Convention on Climate Change (UNFCCC) estimates, REDD credits could in theory account for about 25% of the global carbon market in 2030 (assuming that the system would be based on credits). *Assuming a carbon price of USD 15 per ton, the value of global REDD credit market could reach even USD 30bn. Including afforestation and reforestation credits, forestry-related carbon credits could in theory account for more than 40% of the estimated total market volume (*Figure 19*).*

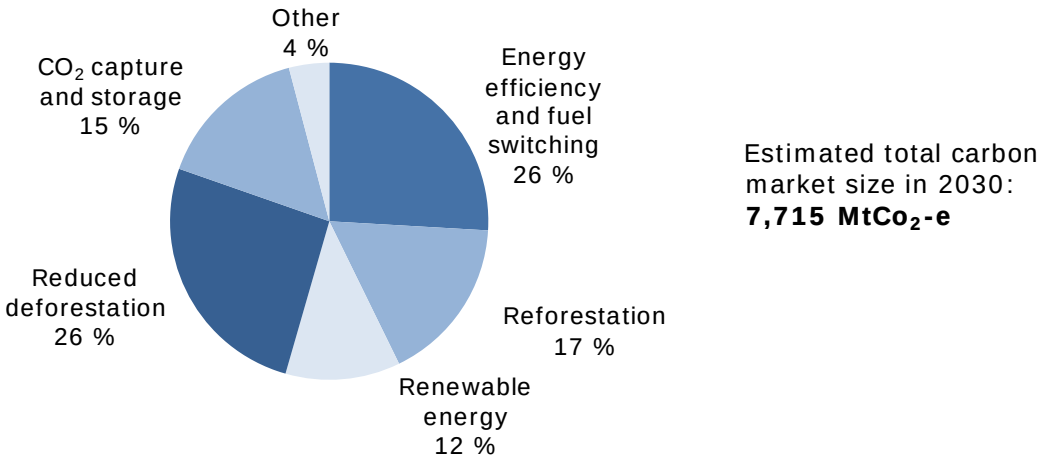

Figure 19 Estimated Carbon Market in 2030 and Annual Emission Reductions Potential by Origin (Maximum Scenario). Source UNFCCC 2008.

Post Copenhagen: the Case for Investing in Renewable Energy and Forestry as Valid as Ever Despite Current Policy Uncertainty

REDD and other forestry-related carbon credits were important questions in United Nations Climate Change Conference in Copenhagen in December 2009. The Copenhagen Accord has disappointed many and certainly it did not reduce policy uncertainty concerning the future carbon credit markets, and long-term price levels. However, from a forestry perspective the accord is a step forward. Further, it needs to be recognised that the underlying issues have not disappeared anywhere: climate change is still happening and huge investments both from public and private sector are needed for climate change mitigation and adaptation. Further, new country-level policies are being adopted that drive the investments and a legally binding global agreement may be achieved in future.

In fact development of a REDD mechanism, which would allow rich countries to pay poorer countries to preserve their rain forests and earn carbon credits, was one of few negotiated issues which actually progressed technically and politically in Copenhagen. Funding is always a crucial issue but in *Copenhagen, an accord was reached with a collective commitment by developed countries for new and additional resources, including forestry and investments through international institutions that will approach USD 30 billion for the period 2010 - 2012.* Significant work is underway on tools to be used in monitoring developing country adherence to their REDD targets. However, without any broader climate agreement, also the REDD agreement appears to be put on hold.

In the fall 2009, land-based carbon offsets were explicitly included in the text of proposed US climate bills. In United States, the US Waxman-Markey proposal (American Clean Energy and Security Act) emphasises offset credits from international forestry projects. If this Bill is passed a huge forestry-based carbon credit market would be created. The bill allows for 1 billion tons of CO2 reductions to come from internationally generated REDD offsets. Five percent of the credits reserved by the government (decreasing in later years to 2%) will be used to generate a fund for Supplemental Emissions Reductions from Reduced Deforestation and build capacity to generate additional international deforestation offsets in the future, with the goal of achieving additional emission reductions equivalent to 10% of US total emissions reduction. *Assuming again a hypothetical carbon price of USD 15 per ton, this facility could potentially create a $15bn fund for conserving the world's forests.*

Implementation of REDD faces a number of challenges including uncertainty concerning the actual financing mechanism, lack of agreement on methodologies, difficulties in monitoring, and ensuring rights of local people and fair distribution of benefits. A lot will depend on what will be agreed in post-Copenhagen climate negotiations and what happens to the proposed American Clean Energy and Security Act.

However, in one way or another, forest-based offsets will play a major role in climate change mitigation in the future. It can well be that increasing, attractive long-term investment opportunities provided by climate change and forestry interface will shape the future of timberland investment. For investors interested in direct or indirect exposure to environmental (forest) assets these developments will create new complementary investment models to traditional timberland investment or an entirely new carbon asset class.

4. Timberland Investment Universe Is Expanding

Estimates on the size of the current global investable timberland universe vary between EUR 300bn and 500bn (The International Woodland Company 2009, Mercer 2006). Investments by TIMOs are estimated account for EUR 50bn, or 10% of total investable timberland.

To meet the increasing wood demand, according to Dasos Capita research about 45-55m hectares of new industrial planted forests are needed by 2030, of which 30-40m hectares are new fast-growing plantations and 15m hectares new planted natural forests. These anticipated new investments and restructuring of ownership of existing assets will increase the current timberland investment market by an estimated EUR 90-110bn.

Institutional timberland investment is spreading from the United States to Europe, Latin America and Asia and even Africa. Figure 20 shows the expected returns in these market areas.

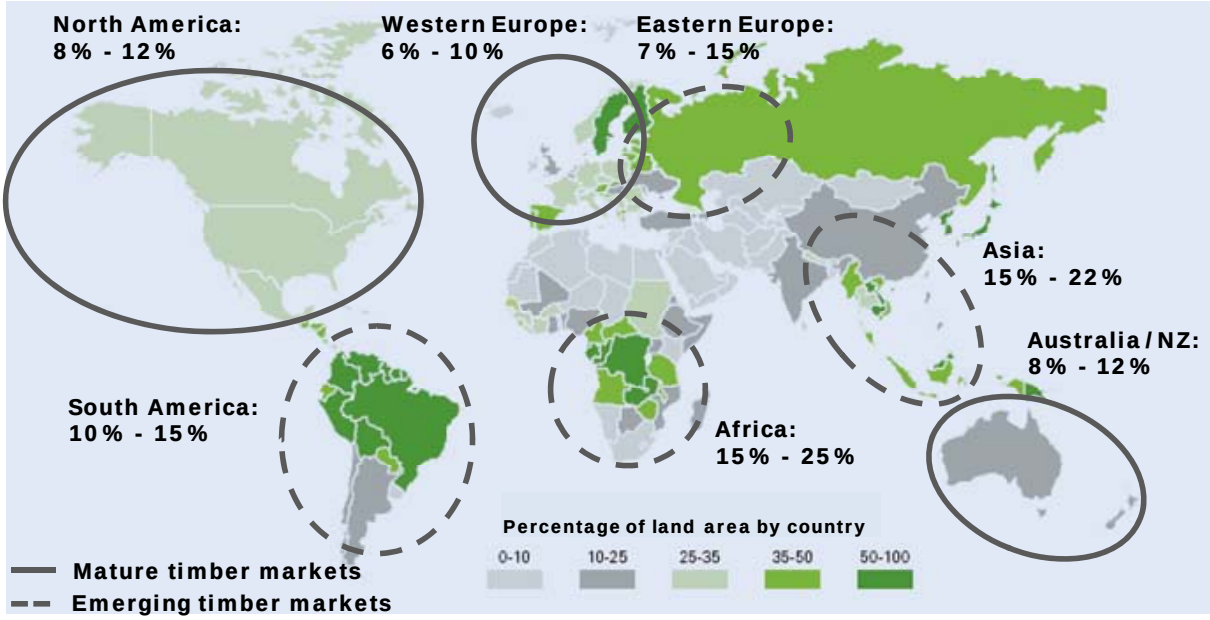

Figure 20 Overview of Global Timberland Regions and Expected IRRs. Sources: Dasos Capital, FAO, Pöyry, First Forest, Hancock Timber Group

Summary Overview of Regional Trends in Timberland Investment

In the *United States*, an innovative financial market thriving on development of new asset classes has driven total timberland market to USD 50-70bn. The country has significant forest resources and the largest forest product market in the world. Despite the stagnant demand for paper products and relatively very mature timberland markets, the United States will remain the world's largest timberland market due to sound basic fundamentals. However, the majority of industrial timberland has already changed ownership from forest industry companies to TIMOs, and the market is very efficient. There is some downward pressure on the rates of return and asset prices may be currently overinflated. In the neighbouring *Canada*, the forest resources are even larger but the majority of timber assets are under public ownership and privatization of public forests does not seem likely.

After the United States, *Australia and New Zealand* have the most established timberland investment platforms. Considerable plantation assets are largely controlled by private sector but the attractiveness of the market is diminished by high number of established players.

In Europe, institutional timberland market has started to develop only quite recently. Bergvik Skog in Sweden and Stora Enso's Tornator in Finland are good examples of successful forest asset divestments by European forest industry companies. Development is mainly driven by the same reasons as earlier in the United States. Development should speed up due to structural changes in the industry, growing investor interest towards timberland investments and growth of alternative investments in broad asset allocation. Another significant factor that increases interest in timberland investments in Europe is the expected increase of bioenergy-related wood revenues which brings both additional revenues to forest owners and increases pulp wood prices.

Russia has the world's largest forest resources, twenty percent of the world's total forest resources, but currently they are not in efficient use. The Russian administration has introduced plans to promote domestic forest industry capacity expansion but the local business environment is subject to high risks. Risks of timberland investments can, however, be reduced if the investment is linked with a major western industrial investor providing a reliable market for wood and a good local market. Uncertainty over log export taxes is another risk element.

Latin America and Asia are becoming increasingly important forest product producers because of the fast growing economies and large population base. Excellent market prospects combined with advantageous growing conditions and low forestry costs make these continents hot spots for forest industry development which further creates major opportunities for timberland investments. In terms of maturity of investment platform, access to established markets, clarity of land tenure, Latin America has a slight advantage over Asia. Interesting timberland investment opportunities will also arise in these areas in the form of partnerships when integrated forest industry companies reconsider the need to own their own forest plantations.

Also *Africa* is potentially interesting yet still more or less undiscovered target for timberland investment. Some African countries, such as South Africa, Mozambique or Tanzania, feature good growing conditions, adequate infrastructure and stable policy and economic environment. In the longer term, the cost competitiveness of the current major emerging economies may deteriorate making Africa more competitive.

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