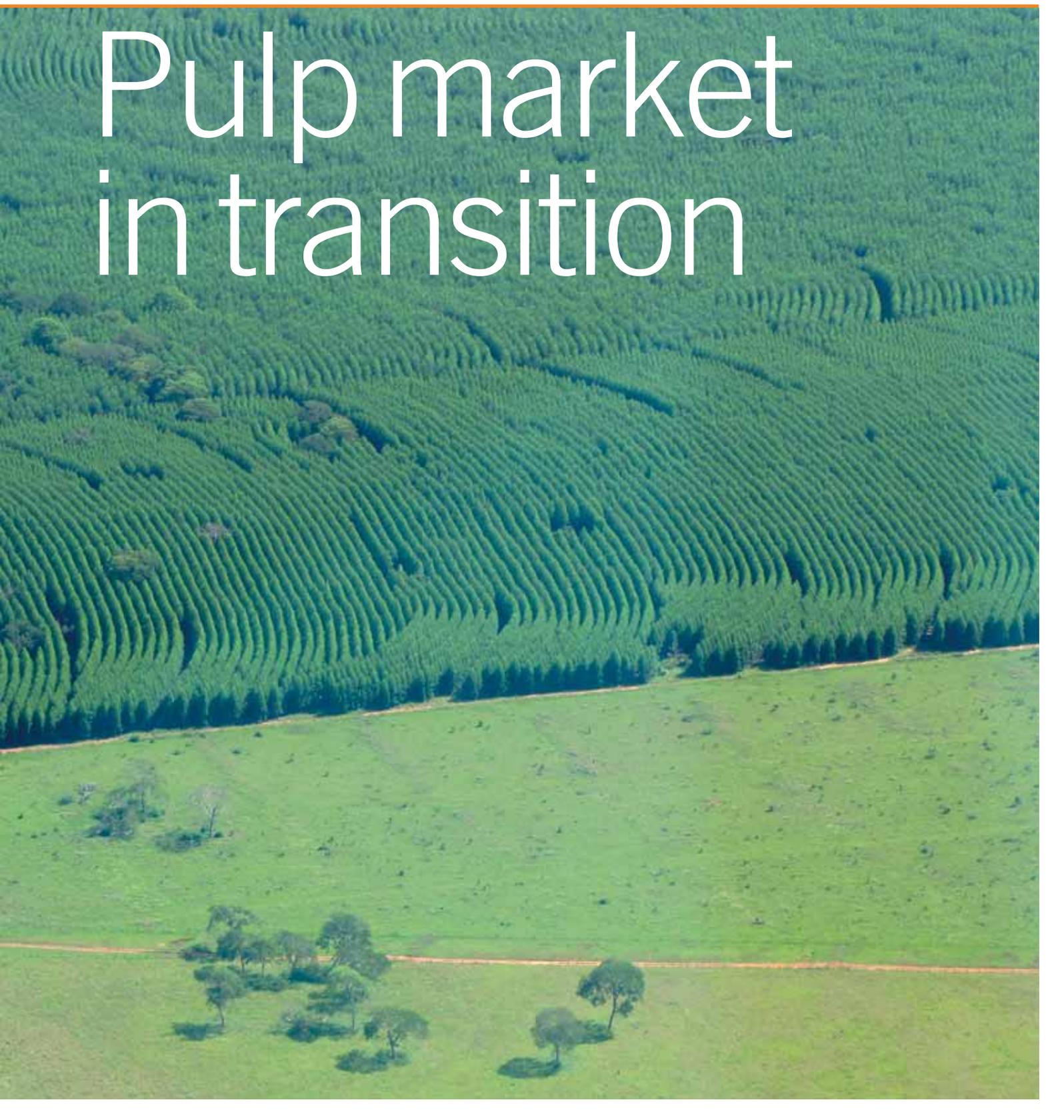


**PÖYRY POINT OF VIEW:
BEING RESOURCE SMART**



Pulp market in transition

Market pulp goes on strong despite stumbles in graphic paper.

One of the long-lived paradigms of the pulp and paper industry has been the strong interlink between graphic paper volume and market pulp demand. Now the partners-in-life seem to be diverging from each other as graphic paper rides off into the sunset, while market pulp still moves full steam ahead. The former models of thinking have become inappropriate over time, and due to changes in industry structure. What does this mean for the global market pulp industry, the rest of the fibre producing market and what opportunities exist going forward?

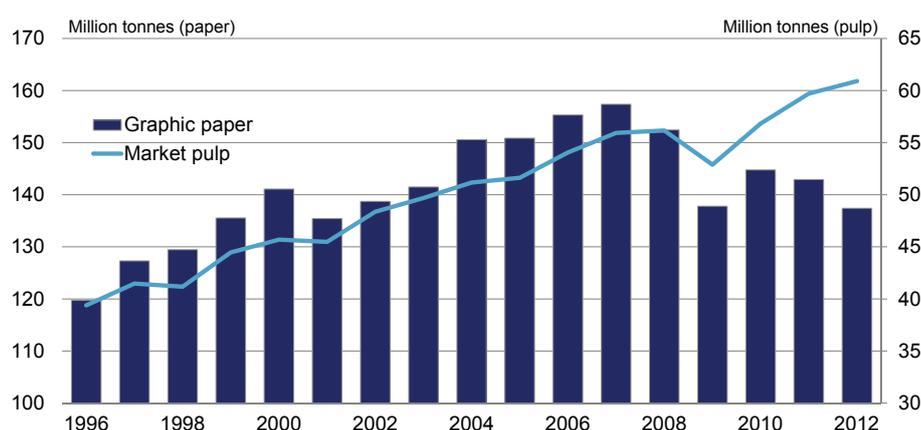
MARKET PULP PROMISE

The diverging trends in the graphic paper and market pulp sector have been clearly visible since the beginning of the 2008 recession. World demand for graphic paper has declined from 157 million tonnes in 2007 to an estimated 139 million tonnes in 2012 (-2.5% pa) while the global demand for market wood pulp has grown from 56 million tonnes to 61 million tonnes (+1.7% pa). Formerly, these two went hand in hand, exhibiting a near perfect linear relationship with global graphic paper demand growing somewhat more slowly (1995-2007 2.3% pa) than the demand for market pulp (2.7% pa) (Figure 1).

In recent years, substantial changes in potentially important pulp demand determinants have taken place that merit investigation. One could successfully condense these phenomena into a cliché “changing dynamics” of the pulp market. In this Pöyry Point of View, we explore the new dynamics of the papermaking fibre market. The most powerful new drivers include:

- Geographic shift of global paper production
- Structural changes in China's pulp supply
- Graphic paper sunset in the West
- Changes in tissue paper fibre consumption

FIGURE 1 - WORLD DEMAND FOR GRAPHIC PAPER AND MARKET PULP 2007-2012



GEOGRAPHIC SHIFT OF GLOBAL PAPER PRODUCTION

The growth of paper production and fibre demand has shifted from the mature fibre-rich western markets to emerging but often resource-poor markets in the East. Essentially but not quite literally this has meant a gradual shift from vertically integrated pulp and paper operations toward market pulp and recovered paper-driven industry.

The growth in North America and Western Europe has stagnated, while Asia, Latin

America and Eastern Europe have shown substantial growth. Of these, the Asian paper industry (excluding Japan) has grown most rapidly. Today the Asian paper market represents 40% of the global papermaking fibre consumption, compared to just 20% in 2000.

Since the turn of the millennium, paper and paperboard production in Asia (excl. Japan) has grown by 83 million tonnes, while the overall production in North America, Western Europe and Japan has declined by 25 million

tonnes. China exclusively accounted for 93% of the global incremental production during 2000-2011.

One of the powerful factors behind this growth has been the increasing global trade of pulp and recovered paper, in 2011 representing 27% of global papermaking fibre consumption. Whilst overall wood pulp consumption has remained relatively flat since 2000, the global trade of wood pulps has grown 41%. Latin American pulp producers have gained most in terms of export volume, followed by Western European and Southeast Asian suppliers.

STRUCTURAL CHANGES IN CHINA'S PULP SUPPLY

As the world's economic powerhouse over the past decade, China's doings and undoings have global implications. The same applies to the pulp and paper industry.

Traditionally, China has used a large proportion of non-wood pulp made from

Item	2000	2011	Growth	CAGR%
	million tonnes		%pa	
Global consumption of papermaking fibre	333.9	405.9	72.0	1.8
Global consumption of wood pulp	167.2	166.2	-0.9	-0.1
Global exports of papermaking fibre	62.6	108.8	46.2	5.2
Virgin wood pulp	36.2	50.9	14.8	3.2
Virgin non-wood pulp	0.3	0.5	0.1	3.2
Recovered paper	26.1	57.4	31.3	7.4
Share of fibre exports out of consumption (%)	18.6	26.7

cereal straw, reed, grass, bagasse and similar for papermaking purposes. In the mid-1990s, the share of non-wood pulps was over 50% of all papermaking fibre raw materials, but since the late 1990s, China has launched serious measures to close down outdated pulp mills to save energy, reduce environmental loads and conserve water. During 2006-2011, closures of old capacity with mainly non-wood pulp furnish totalled 7.5 million tonnes, while entry (new non-wood fibre projects and expansions) has not nearly compensated for the exit.



Market pulp drivers:

- geographic shift of paper production
- structural changes in China's fibre supply
- graphic paper sunset
- changes in tissue paper furnish

Trend is your friend ... until it ends

Closures of non-wood pulp capacity have been a major factor behind increased recovered paper and market pulp shipments to China. Today, the use of non-wood pulp in China is about 12 million tonnes (12% of total papermaking fibre consumption), and yet, despite its diminished share, remains an important moving part impacting the future of the market pulp business globally. The recent progress in building medium-scale non-wood pulping lines suggests that part of the anticipated growth in China's paper production can be satisfied with non-wood fibre material. However, completed and announced closures seem to outweigh capacity increases. The evolving fibre gap will be filled partly by recovered paper, and partly by virgin fibre pulps, including market pulp.

GRAPHIC PAPER SUNSET

The emergence of new media will have important implications on papermaking fibre demand, including virgin pulps and recovered paper. The global newsprint industry is in secular decline, and consequently, the industry's fibre requirements are forecast to decrease in the long term. Printing/writing paper production is declining in the West and Japan with a similar effect, and approaching maturity in the emerging markets, too. In 2012, the combined demand for printing/writing papers in North America, Western

Europe and Japan declined 5.8% pa while the emerging markets in Asia, Latin America and Africa showed a 3.3% pa growth.

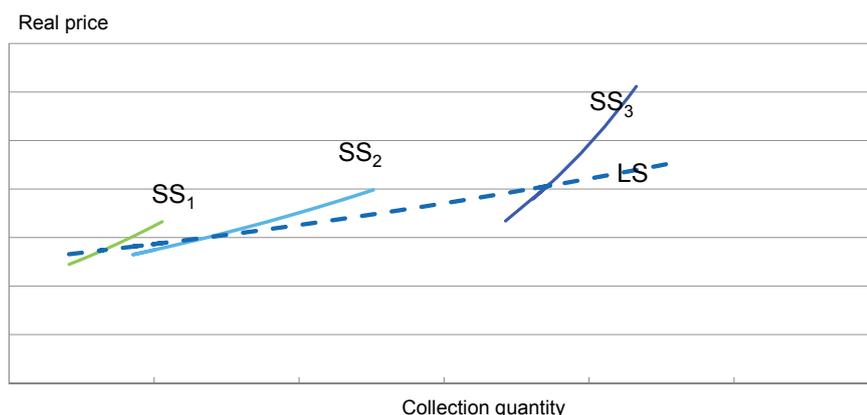
The graphic paper sunset will have both direct and indirect effects on market pulp demand. The most significant direct effect is the weakening demand for print in mature markets, which inevitably leads to declining fibre consumption in the western graphic paper industry. As for the rest of the world, the future development trend depends on the growth of the graphic paper industry especially in China, India and Southeast Asia.

The indirect effects of the graphic paper sunset are more positive, when viewed from the market pulp producers' perspective. As demand for print in the West declines, the availability of white recovered paper for collection tightens, and causes fibre supply problems especially for the resource-poor regions such as Asia. With collection of recovered paper approaching its collectable potential in the West and Japan, the supply becomes increasingly inelastic (Figure 2). The marginal cost curve turns upward, and at some point becomes nearly vertical. Consequently, the global paper sector will face both increasing and highly volatile prices of, paradoxically, lower quality recovered paper raw material.

The overall volume effect of the decline of graphic paper demand on recovered paper supply is significant. The present consumption of graphic paper in North America, Western Europe and Japan is approximately 70 million tonnes pa. At least 35 million tonnes is reused in these regions for the production of graphic papers, packaging boards and tissue paper. The global trade in Old Newspapers (ONP) and High Grade Deinking/Pulp Substitutes (HG/PS) amounts to 20 million tonnes pa, of which 90% originates from mature markets. In addition, a considerable part of graphic waste is collected, used and exported as mixed paper. With simple math and very basic assumptions, a 10% reduction in graphic paper demand in mature markets could lead to an over 20% reduction in exportable surplus. This would mainly impact Asia Pacific paper producers.

Yet, the production of tissue paper and packaging boards will continue to grow in the long term, driven in particular by the fast-growing Asian markets. For the Asian paper and paperboard industry, the increasing complications of offshore recovered paper supply will create a major stimulus for increased domestic collection, but also increasing recovered paper procurement costs and prices, and potential substitution of recovered paper by virgin fibre pulps.

FIGURE 2 - WITH RP COLLECTION APPROACHING ITS COLLECTABLE POTENTIAL THE SUPPLY BECOMES INCREASINGLY INELASTIC



CHANGES IN TISSUE PAPER FURNISH

The graphic paper sunset in the West will potentially lead to furnish changes in tissue, printing paper and boxboard production. The tissue paper industry will face increasing costs of recovered high grade printing material, making it less attractive compared to virgin fibre pulps. The price of recovered paper coupled with the process losses of high quality deinking grades (up to 35-40%), increased energy costs, and increasing landfill costs for deinking sludge have deteriorated the competitiveness of secondary fibre in tissue paper production.



In addition, the markets' desire for higher quality tissue paper means that the tissue paper industry has become an increasingly significant client segment for market pulp (BSKP and BHKP) producers, especially for those using plantation-grown eucalypt raw materials. This trend is expected to continue, as the share of virgin fibre pulps out of total fibre intake volume in the world's tissue paper industry is expected to grow from the present 60% to 65% by 2020. As upstream integration in tissue paper is quite unusual, it is the market pulp sector that will benefit most from this trend.

GOOD DEMAND PROSPECTS BUT NARROWING MARGINS

In the medium term, fibre demand prospects are still very much uncertain. They are expected to be modest for mature markets, but much better for emerging regions of Asia and Latin America. However, the world economy is still fragile, and downside risks remain.

In the longer term, paper markets are projected to grow slower than the 3.6%/annum expected global economic growth through 2020, specific projections include:

- Paper and paperboard demand growth will be 1.7% pa
- World consumption of papermaking fibre and fluff pulps will grow from 407 million tonnes to 478 million tonnes (CAGR 1.8% pa)
- Demand for market pulp will grow from 58 million tonnes to 72 million tonnes (CAGR 2.4% pa).

Over the long term, paper and paperboard demand growth will be impacted by the availability of affordable substitutes for paper in advertising and communication related end uses, and also in certain fibre-based packaging applications. Declining basis weights and a trend favouring lightweight packaging will also play a role.

Potential implications of graphic paper sunset

- Reduced fibre consumption in mature markets
- Reduced recovered paper export surplus in North America, Western Europe & Japan
- Recovered paper supply gap in Asia
- Permanent increase in recovered paper prices
- Furnish changes across tissue, graphics and packaging
- Intensified recovered paper collection in emerging markets
- Substitution of recovered paper by virgin fibre/market pulp



Comparative advantage of traditional low-cost areas has eroded

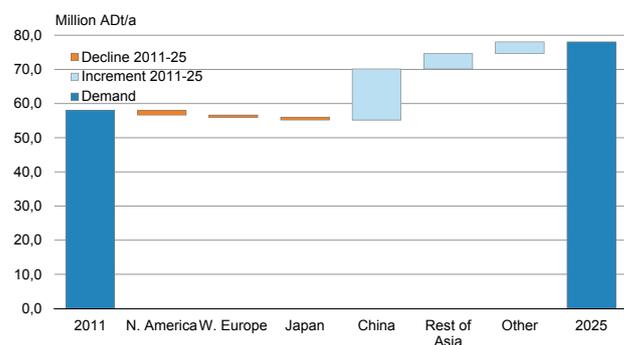
One of the overwhelming features of market pulp business has been the declining real price of pulp. The main reasons for this have been:

- The general adequacy and declining real prices of main production inputs such as wood
- Technological development, i.e. energy self-sufficiency, developments in material saving technologies etc.
- Growing mill capacities and increasing economies of scale
- Declining transport costs due to rationalization of deliveries,
- Emergence of new, low-cost production mainly in Latin America and Asia.

In consequence, the pulp industry's supply curves have flattened and shifted downward (Figure 3).

The rising demand for woody biomass energy on one hand, and competition for agricultural land on the other, have raised the price of land for fast-growing plantations, and thus the price of wood. In consequence, the cost of pulp production has increased. If this increase has an effect on the market clearing price (cost position of marginal producer), the future price level will rise. If it affects the lower sections of the supply curve (e.g. cost leaders), the producer surplus will decrease, with possible indirect, upward effect on market clearing price. The price-cost dynamics illustrated in the adjacent graph illustrate the latter scenario (i.e. narrowing margins of the cost leaders.)

FIGURE 3 - MARKET WOOD PULP DEMAND 2011-2025 – KEY SOURCES OF GROWTH



NEW FIBRE BASKETS

Fostering upstream investments in traditional supply areas is an important alternative for paper companies trying to secure their fibre supply in the long term. As land and labour costs are increasing faster than inflation, the cost of wood in places such as Brazil, Uruguay and China will rise. Brazil, Uruguay and Indonesian Sumatra will still lead the growth of market pulp production through 2020, but their cost advantage is gradually diminishing, indicating narrowing margins for (hardwood) pulp production (Figure 4). Management of logistics costs in the pulp supply chain as well as intimate marketing relations with future customers will become increasingly important competitive differentiators for the industry. Increasing wood cost is also triggering a search for alternative fibre baskets and innovation in forestry practices.

Will Africa be the next Eldorado for the pulp and paper industry? Could Indochina, PNG/Irian Jaya or Paraguay, provide similar opportunities? See Figure 5 for a prediction of market wood pulp demand through to 2025.

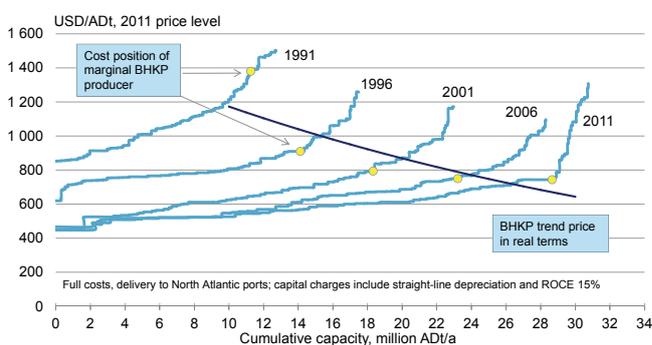
In fast-growing plantations labour costs can account for up to 40-60% of the delivered wood costs even for those using modern technologies. When labour costs rise faster than overall inflation, we see increased mechanization and automation of forestry activities. The search for lower wood costs also triggers the adoption of enhanced biotechnologies with the promise of improved yield/input ratios.

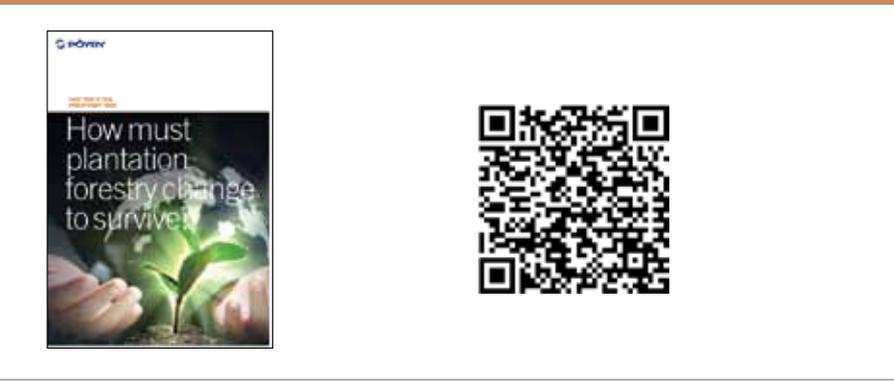
PROMISING OUTLOOK BUT LOTS OF MOVING PARTS

The future of the market pulp business could be very promising, despite the digital revolution and consequent shutdown of graphic paper production in the West. The main prerequisites for expanding the market pulp business are:

- Declining supply, deteriorating quality and increasing cost of recovered paper triggering furnish changes in tissue, packaging paper and graphic paper production.
 - Strong economic growth and increasing paper production in China, India and other fibre-poor regions of the world.
 - Continuous structural transformation and change from environmentally harmful to sustainable operations: closures of obsolete (non-wood) pulp mills with inadequate environmental facilities.
 - Strengthening consumer demand for high-quality tissue paper products.
 - Cost competitive market pulp industry providing a viable alternative to integrated pulp and paper operations particularly in the growth regions of the world.
 - Modern market pulp mills acting both as fibre and renewable energy suppliers
- The challenge is that some of the above factors develop in opposite directions. Likewise, the growth of international paper

FIGURE 4 - FLATTENING AND DOWNWARD-SHIFTING PULP SUPPLY CURVE HAS RESULTED IN DECLINING LONG-TERM TREND PRICES





trade relative to fibre trade would have a reversed impact on market pulp business. Therefore, and in addition to being cost-effective itself, it is the competitiveness of the customer industry, i.e. non-integrated paper producers vis-à-vis local and offshore integrated mills – particularly in the growth markets – that plays a pivotal role in the overall success of the market pulp business.

FIBRE STRATEGY IS THE KEY

Fibre remains the major competitive differentiator between winners and losers in the global pulp and paper industry. Winners will regularly be those companies that can intelligently integrate low cost fibre sources with a high growth market. It is clear that regional supply and demand imbalances will continue to grow, and balancing these deficits will be a major challenge for the industry.

Understanding forest and fibre supply dynamics is of strategic importance for all business participants. Pöyry has extensive experience and insight into the global fibre market to help resource-dependent firms develop their strategy across a broad front of fibrous raw materials, including indigenous or plantation wood, non-wood raw materials, market pulps, recovered paper and biofuel feedstock, to mention but a few.

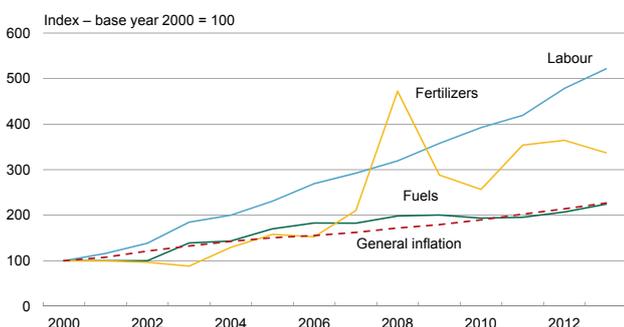


New fibre baskets – key conditions and drivers:

- Competitive land costs
- Good growing conditions and availability of fresh water
- Labour cost advantages
- Logistics – proximity to Asia
- High priority status (rural development, deforestation)
- Incentive policies

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FIGURE 5 - ELEMENTS OF PLANTATION COST DEVELOPMENT – CASE BRAZIL



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At Pöyry, we encourage our global network of experts to actively contribute to the debate - generating fresh insight and challenging the status quo. The Pöyry Point of View is our practical, accessible and issues-based approach to sharing our latest thinking.

We invite you to take a look – please let us know your thoughts.

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