

# The Future Development of the European and Global Tissue Industry and its Fiber Furnish

## Global View

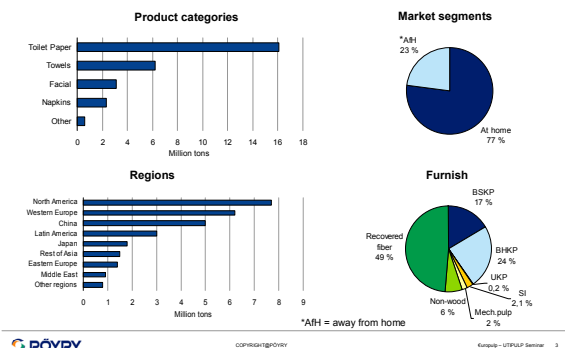
### Tissue markets

World annual tissue consumption totals about 28 million tons

Toilet paper is by far the largest product category, due to its dominant position in the emerging markets. Usage of towels and other categories is common only in the developed markets and the share increases with increasing wealth and consumption per capita. Facials/hankies are the largest category for instance in many Muslim countries.

The consumer segment, so called At Home, accounts for over 75 % of the global market. Away from Home, AfH, varies between some 10 % and 30 % being lowest in the emerging markets and highest in North America where the life style favors tourism, eating out etc.

#### WORLD ANNUAL TISSUE CONSUMPTION TOTALS ABOUT 28 MILLION TONS



Worldwide recovered fiber accounts for little less than half of the total fiber usage. The recovered fiber share has been declining due to trend towards premium qualities and improved qualities in almost every category and quality level especially in the mature markets in NA and Western Europe. AfH is typically predominantly recovered fiber based. BHKP dominates on virgin fiber side.

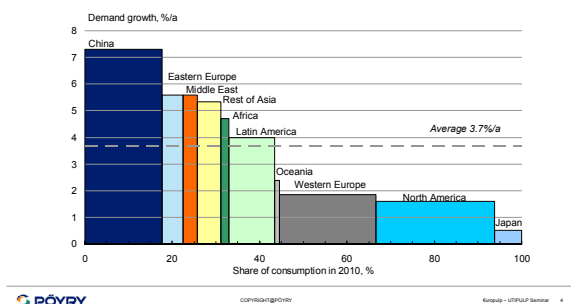
North America and Europe together account for over half of the global market. China is the third largest and the fastest growing tissue market and will bypass NA in tissue market size before the end of the decade.

The continuous tissue demand growth bases on population growth and on the increase of the per capita

consumption. The latter has strong correlation with economic wealth; GDP and purchasing power. Average per capita tissue consumption is almost 25 kg in North America and clearly below 5 kg in China, Eastern Europe and other regions where the demand growth is the strongest. There is plenty of potential when low per capita consumption combines with vast population and strong economic development.

#### DEMAND GROWTH AVERAGES 3,7% PER ANNUM THROUGH 2020

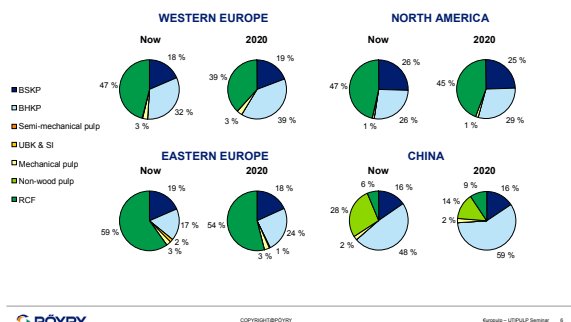
Emerging markets in Asia and Eastern Europe show the strongest growth. Gradually maturing markets in the West will grow at a much slower pace.



## Fiber Furnishes

#### SHARE OF RECOVERED FIBER IS DECLINING IN TISSUE FURNISH

We expect slower growth for the RCF based tissue and increasing share of virgin fiber, especially BHKP.



In Western Europe, recycled fiber accounts for approximately 47 % of the total tissue furnish. In the recent years, the share has been declining due to increasing quality requirements (trend towards softer and bulkier products), Italian companies' (typically virgin based) rapid expansion to other European regions, restricted availability of suitable recovered fiber grades for tissue and the

uncertain economic benefits of recovered fiber usage especially over the pulp price cycle. Practically all new projects (AH) have been virgin based and several mills that have DIP capacity have not been fully using it.

The leading European producers of recovered fiber based tissue have been able to develop high quality tissue products based on DIP that are quite comparable to virgin products and where there is little or no difference in product price. In certain regions, this business will have future prospects whereas there is less growth for the 'economy' tissue business based on recovered fiber. Decline of RCF share in average tissue furnish will continue.

In Eastern Europe, the share of recovered fiber is higher and its estimated decline less significant as tissue growth is still based on penetration of usage more than on improvement of quality. The level of disposable income is still relatively low and preferred products 'economic'. Also this trend is changing; good examples are Poland and Russia where virgin based tissue has made clear progress, judging by the latest projects (ICT-Tronchetti and Metsä-Tissue in Poland and some Russian projects.)

In North America, the overall share of recovered fiber is similar to that in Europe and declining as well. In consumer tissue the move towards premium tissue is even more forthcoming than in Europe. Several recent investments target to manufacture of ultra and premium quality tissue, for instance there are many new TAD (through –air- dried) machines. In addition to the branded segment, these investments have emerged even on the private label segment. TAD products require strong virgin fiber. High share of kitchen towel and TAD products impacts the relatively taken high shares of BSKP in comparison to BHKP in the average North American tissue furnish.

The AfH tissue segment is substantially better developed in the US than in Europe and the use of recovered fiber is especially based on that and somewhat less on strive for 'economy' or 'environmental' business. However, in the US, in addition to premium qualities, also recycled fiber based tissue clearly grows for ecologic reasons and due to retailer impact.

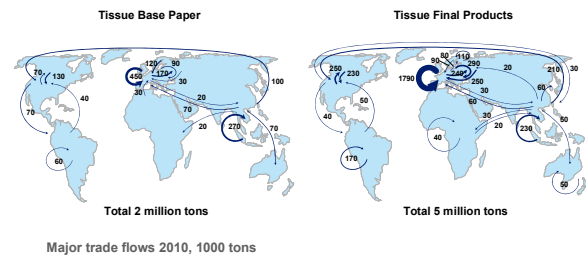
In China, the typical raw material mix of 'medium quality' tissue consists of several components, recovered fiber (low quality, mixed), straw or bagasse pulp and the upper quality fraction consists of virgin wood pulp. The large new tissue projects are typically based on imported virgin pulp, especially BHKP.

The main trend will continue to be the replacement of non-wood pulp by chemical wood pulp. This will

continue as small old pulp mills are closed for environmental reasons. Only very recently some Chinese companies (such as Huizhou Fook Woo) have started to build modern DIP plants. High quality recovered fiber is imported (for instance from Europe).

## Tissue Trade Flows

TISSUE TRADE FLOWS ARE TYPICALLY MOSTLY WITHIN REGIONS



There are no global tissue markets, though a few players are present in several markets and some leading brands are increasingly global.

Especially converted tissue products have relatively low weight in relation to volume they take when packed for retail distribution, i.e. tissue is bulky and logistic costs are rather high in relation to the total value of the shipment. For this reason, very long transport distances normally limit the attractiveness of tissue exports to far-away markets, especially for instance transports from one continent to another. The trade is most typically within regions, for instance between European countries, between US and Canada and between Asian countries.

Tissue Jumbo Reel transportation is more cost efficient than that of finished products, but as the value of reels is lower than that of products; again very long transports are rather an exception than something typical. As the most common business model everywhere is integrated base paper and converting operations, base paper trade flows are actually much smaller scale than product trade flows both within and between regions. Total volume of major foreign trade flows of finished products is therefore more than double (5 million tons) compared to that of Jumbo Reels (2 million tons).

The most significant intercontinental trade flows are Chinese exports of especially finished products to North America. The product trade has

been rapidly increasing. Chinese and Indonesian producers export also reels and products to Australia. However, except for the Australian flows, no intercontinental flows have any significant impact in any tissue markets as relative to the market size in the destination, these flows are fairly small. Asian internal exports from China and Indonesia are, however, significant. (Chinese tissue exports total 0,5 million tons consisting 85 % of finished products)

Asian imported tissue products or reels to Europe do not play a major role. However, what has been speculated and what might impact the European balance especially from a pulp producer's point of view, is the entry of Asian companies to European tissue markets via acquisitions or by new investments. Those companies who sell also market pulp have perhaps the highest interest for this.

## European Tissue

The European tissue market is very fragmented compared to North America and the appearance of small new players further continues especially in Eastern Europe.

Pulp integration is very rare – there is only SCA Mannheim in WE and some Russian and Ukrainian players that have sulphite integration. Practically all virgin fiber based producers are dependant on market pulp though a few have some potential to use also dried captive pulp.

## Environment and Forest Certification

### TWO IMPORTANT INTERNATIONAL CERTIFICATION SCHEMES

**FSC = Forest Stewardship Council**



- FSC pure label requires even 100 % FSC certified raw material
- FSC certified forest area is smaller
- Latin American plantations are predominantly FSC certified
- FSC certified NBSKP volumes are limited
- FSC is preferred by retailers and is clearly more emphasized in tissue

**PEFC = Programme for the Enforcement of Forest Certification**



- PEFC has lower minimum thresholds for labeling and less rules for material from controlled sources
- Global availability of PEFC certified market pulp is higher due to larger certified forest area
- PEFC is supported by small forest owners' associations, by some industries and by many national governments.
- PEFC is clearly less emphasized in tissue.

The environmental attention is developing away from the impacts of a mill on the local environment towards broader awareness of sustainability issues.

Following issues are on the rise:

- Packaging, recycling and chemicals -> bio plastics
- Fresh water issues -> water foot printing of products

The requirement of forest certification originates from retailer interest. The status of forest certification may rise with potential linking of certification with other instruments (public procurement, eco-labeling, carbon sequestration).

Several tissue producers consider eco-labels and other wider perspectives as more important than forest certification. Companies who have launched new sustainable tissue products have covered both sustainable fibre base and greenhouse gas aspects in their products.

The two most prominent international certification schemes are **FSC** and **PEFC**.

Labeling of an end product in both schemes requires:

- Raw materials are sourced following the rules of the certification scheme
- The chain-of custody certification is issued for the production site. (Chain-of-custody certificates ensure that the raw material can be followed through each step of the transportation and production process.)

In certified pulp supply, the chain-of-custody certification is not the problem but the availability of certified raw material is more limited.

The global availability of PEFC certified market pulp will be better than that of FSC certified due to larger certified forest area. The supply of certified pulp is likely to remain low in Asia.

Certified market pulp will be available for those with annually or otherwise contracted certified volumes. For spot volumes, certified pulp is not necessarily available. However, FSC certified NBSKP volumes are still limited.

The same applies with tissue as with pulp. All the main tissue producers in Europe are at least partially certified with either one or both of the main schemes; thus most tissue producers have theoretically the potential to produce certified products, but that potential is not necessarily utilized. The actually certified tissue volumes have been fairly modest, though increasing (mostly if clients request, typically not initiated by the supplier). Typical is that the tissue product is not labelled but the pulp is sourced from chain-of-






custody certified producers and controlled sources.

## ECF and TCF

Like the request for certification, demand for ECF or TCF usage in tissue comes from retailer initiative and is not initiated by the producers. General demand trend for TCF market pulp has been declining since mid 2000's and there are still more negative than positive drivers related to TCF market pulp demand though the decline has been slowing down and there are some signals of a reviving TCF interest.

## Technical Aspects in Tissue Fiber Selection

**SOFTNESS IS IMPORTANT FOR FACIAL TISSUE, TOILET PAPER AND HANDKERCHIEFS, WHEREAS ABSORBENCY AND STRENGTH ARE IMPORTANT FOR TOWELING**

Product categories	Fibre furnish	Main quality issues
<b>Toilet paper</b> 1-7 plies 15-32 g/m <sup>2</sup> Typically 16.5 g/m <sup>2</sup>	 <ul style="list-style-type: none"><li>Recycled fiber</li><li>BHKP 70%, BSKP 30%. BHKP content can be as high as 80-90%.</li></ul>	<b>Softness</b> , absorbency, brightness, appearance/cleanness, strength & bulkiness
<b>Towels</b> (kitchen/hand towels, wipes) 1-3 plies 19-70 g/m <sup>2</sup> Typically 18.5 g/m <sup>2</sup>	 <ul style="list-style-type: none"><li>Recycled fiber</li><li>BHKP 30-50%, BSKP 50-70%</li></ul>	<b>Absorbency, strength and wet strength</b> , appearance/cleanness, bulk, stiffness
<b>Facial / handkerchief</b> 1-4 plies 4-18 g/m <sup>2</sup> Typically 7-11 g/m <sup>2</sup>	 <ul style="list-style-type: none"><li>BHKP 80%, BSKP 20%. Even 100% BHKP can be used.</li></ul>	<b>Softness</b> , absorbency, brightness, cleanliness, strength & bulkiness
<b>Napkins / serviettes</b> 1-3 plies 7-18 g/m <sup>2</sup>	 <ul style="list-style-type: none"><li>BHKP 60%, BSKP 40%.</li><li>For colored products higher shares of BSKP</li></ul>	Absorbency, wet strength, appearance/cleanness, strength, certain stiffness, brightness
<b>Others</b> (e.g. medical)	 <ul style="list-style-type: none"><li>BHKP 50%, BSKP 50%. In some cases even 65/35.</li><li>Some recycled fibre products</li></ul>	Depending on use (typically softness, absorbency, bulk, strength, cleanliness)



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In product categories where softness is the most important property (such as toilet paper and facials/hankies), BHKP, and especially BEKP is the preferred fiber.

When absorbency is targeted, like in (kitchen) towels and napkins; BSKP share needs to be clearly higher. Best absorption properties are given by southern softwood fiber (just as in fluff pulps). However, for premium quality kitchen towels, often based on TAD technology, the best fiber is the very high quality NBSKP. As BSKP is partly used also for the strength properties, NBSKP is especially suitable for low g/m<sup>2</sup> TAD products.

Recovered fiber suits best for toilet paper and towels and is not much used in hankies or napkins.

Between Private Label and Branded market segments there is no great difference in fiber furnish. The leading brands, especially the premium brands of the multinationals, are virgin fiber based and also the high quality of the fiber is much emphasized. BEKP and even there only selected suppliers are used. However, there are also regional or local brands with recovered fiber content up to 100 %; and some of the producers

reach a quality where the recycled content is imperceptible.

Private Label products do not necessarily represent lower quality or are not primarily recycled fiber based, especially as the leading PL producers are the Italians that historically and typically have always been producers of very high quality virgin fiber based products.

Tissue furnish is determined by the new PM technology developments as well. As an example, Metso's new NTT (structural tissue) is for virgin fiber while ATMOS, similar new development by Voith, can use also recovered fiber.

Last and not least, the fiber furnish is an economic decision. In virgin fiber the usage of BHKP has been increasing due to quality issues and special suitability of BEKP for tissue, but also due to the price differential between BHKP and BSKP. However, an equally important economic driver is the refining energy saving as the hardwood component does not need to be refined. Careful choice of BSKP quality can help to optimize the furnish cost, i.e. to maximize the BHKP content.

Of BHKP market pulps, BEKP is mainly used for tissue. In BSKP, the end use shares between sub-grades are less significant except for the fact that though southern pine paper pulp is losing share in other end uses, it is suitable for tissue due to the absorption properties. NBSKP and Radiata are relatively more suitable for printing and writing papers.

## Break-Even between Recovered Fiber and Pulp

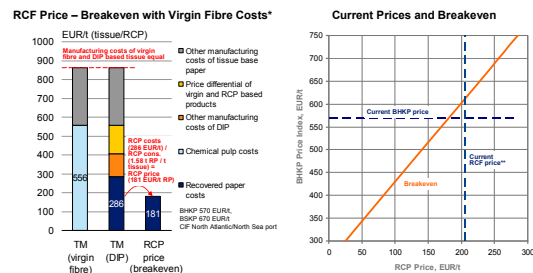
High fiber prices were squeezing the margins for tissue producers at least in the beginning of 2011. Pulp prices were some 15 % higher than in the same period one year earlier and recovered fiber prices some 30 % higher. Obviously the situation did not favor recovered fiber based production. However, the situation was similar even when the pulp prices were very low in 2009 as it was difficult to be competitive against higher quality product when the virgin based fiber costs were particularly low.

The future prospects for recovered fiber availability and prices do not look very promising. The Chinese imports and appetite for fiber, including RCF, seem to have no end and at the same time graphic papers, the source of High Grades, ONP/OMG (old news and mags), are experiencing demand decline while also the local

demand of RCF is increasing. In order to supply the demanded volumes, the collection rates would have to increase. Increasing collection rates are likely to lead to higher collection costs and consequently prices and, in addition, to a deteriorating quality.

#### TISSUE PRODUCERS' RCF PAYING CAPABILITY IS LOWER THAN THAT OF MANY OTHER GRADES

Recovered paper prices have been above the estimated breakeven point



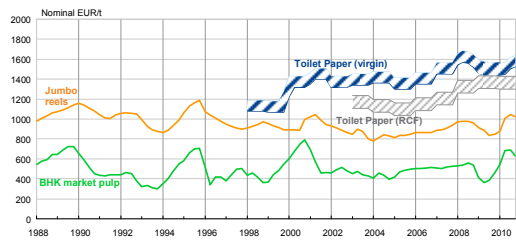
\*) The analysis is based on average manufacturing costs in Europe. \*\*) Central European price for 2.05 Sorted office paper grade or similar.

Tissue, due to lower yield (no use for minerals in paper), is the least feasible user of woodfree recovered paper and the fiber paying capability of for instance white surface boards is much better.

According to Pöyry's cost competitiveness analysis, European tissue producers can, as an average, pay some 180 EUR/t recovered fiber to break even with the current pulp prices. This estimate includes an assumption of 150 EUR/t price difference between virgin and recovered based product. Would the quality of the RCF based product match with the virgin based product or were the retailers willing to pay extra for the ecologic image and RCF content, then the break even point would be higher.

#### MARKET PULP PRICE AND TISSUE PAPER PRICE. IS THERE A CORRELATION ?

RCF based products have clearly lower price level; therefore raw material prices must allow for lower manufacturing costs.



PÖYRY  
corporate@poyry.com  
Kortte - UTP&P Seminar  
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We estimate almost half of the European RCF based tissue capacity to be in a 'swing' position. These mills/machines have been using both fibers in the past and are the first to adjust their production according to the production economies and to changing price relationships. In early 2011, many recycled fiber based producers have been increasing their virgin fiber-base production, at least temporarily.

THANK YOU!

**PÖYRY**  
Engineering balanced sustainability™



CONTACT:

NAME: PIIRKKO PETÄJÄ  
TITLE: PRINCIPAL  
MAIL: PIIRKKO.PETAJA@POYRY.COM  
PHONE: +358 10 33 22329

PÖYRY  
corporate@poyry.com  
Kortte - UTP&P Seminar  
13 September 2011 - Pirkko Petäjä