

8 Paper, paperboard and woodpulp markets, 2011-2012

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Highlights

- Paper and paperboard output fell along with overall industrial production in both Europe and the US, as the recovery stalled with mill closures, mainly the result of poor financial performance.
 - A wave of consolidations and takeovers reduced demand for pulp commodities across Europe and North America; however, volumes to Asia, particularly China were stronger in 2011 and in early 2012.
 - Generally, market conditions were mixed from 2011 to early 2012, as prices peaked and then subsequently fell following overcapacity for most pulp, paper and paperboard commodities.
 - The Russian Federation is experiencing consolidation within the newsprint and magazine papers segments. Increased efficiency is needed as the forestry industry as a whole is noticing the effects of that country's entry into the World Trade Organization.
 - European paper and paperboard output and consumption declined in 2011, following a recovery in 2010, with pulp production remaining essentially unchanged.
 - A wave of green transformation and biomass projects continued in 2011, with several North American pulp, paper and paperboard mills receiving subsidies.
 - The conclusion of stimulus spending by either European or North American governments left an economic void that the marketplace could not immediately replace.
 - Massive capital spending stemming from liberal credit markets in China allowed for European and North American pulp and recovered paper demand to soar in 2011, but tapering off in early 2012.
 - China has become the number one global market for chemical market pulp.
 - South American chemical market pulp expansions continue to make headlines. Incremental capacity announcements have exceeded forecast demand, leading to likely project delays and closures of higher-cost mills in the rest of the world.
 - Green and sustainable product features such as use of renewable resources and product recyclability help support sustainability initiatives and an evolving symbiotic relationship between pulp and paper market development and the green economy.
 - The theme of sustainability continues to resonate among pulp and paper companies throughout the UNECE region as firms develop pathways to help achieve product innovation and market growth, such as biorefining, biomass energy production, and development as well as commercialization of nano-cellulosic fibres.
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8.1 Introduction

A global rebound that began in 2009 following the financial crisis began to unravel in the second half of 2011 as capacity outgrew demand, prices were rebounding too quickly for consumers to absorb, and economic conditions in North America and Europe were deteriorating. Corporate restructuring, industry consolidation and investment in innovative forestry practices and products were at the forefront of many industry players' strategies to become increasingly efficient and remain competitive with lower-cost regions.

Generally less favourable market conditions prevailed in the UNECE region and globally from 2011 to early 2012, with softening prices for most pulp, paper and paperboard commodities. Production of these commodities was mostly down, but only pulp and the collection and sale of recovered papers managed to improve, on strong demand from Asian customers. A slower economic environment unfolding in China in early 2012 has the potential for further industry rationalization.

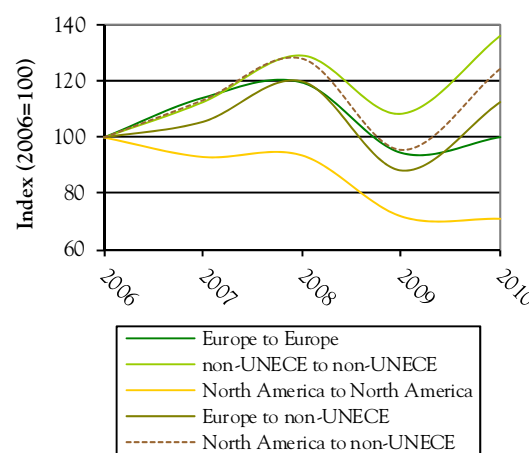
In Europe and North America, 2011-2012 was a repeat of the 2010-2011 regional capacity shutdowns, leading to tighter supply-demand balances. Prices in general fell in the second half of 2011, and an attempt at a recovery in early 2012 may have failed or else been delayed until further capacity has been taken out of the system. Market pulp prices that fell in the second half of 2011 were on the rebound in 2012. Whereas bleached hardwood kraft (BHK) prices increased by 21% (as at June 2012) from their December 2011 lows in the eurozone, northern bleached softwood kraft (NBSK) levels rose a mere 3%.

In July 2012, NBSK prices resumed their downward spiral, and the differential between the two grades has narrowed to a 5-year low (Foex, 2012). Chronic overcapacity across several pulp, paper and paperboard grades, allowed to proliferate as financially restructured mills resume production, continues to drive mills to increased levels of efficiency, while lowering costs. The much-anticipated full recovery in output has been delayed by such closures, and impels the sector to push forward with the development of green technology, such as wood-based biorefineries and biofuels.

Paper and paperboard trade flows between UNECE subregions reflect differences in regional growth, competitiveness and shifts in currency exchange rates. The total value of the top five international trade flows of paper and paperboard between UNECE subregions for 2009-2010 was \$184 billion, down 8.0% from 2008-2009. Capacity closures and a weak US currency against the Canadian dollar and euro were enough to offset much of the recovery from the 2008 global financial crisis (graph 8.1.1).

GRAPH 8.1.1

Top five global trade flows of paper and paperboard by value, 2006-2010



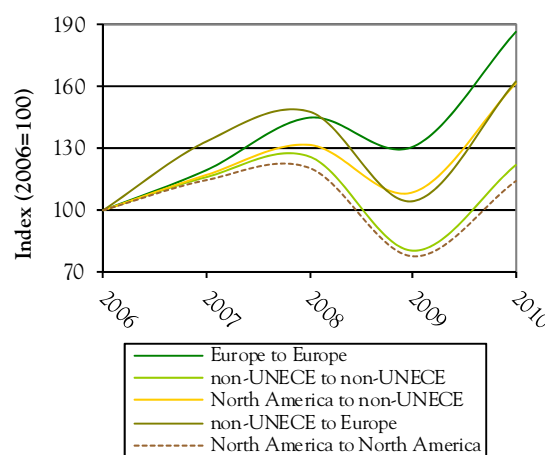
Note: Total value of imports for 2009-2010 was \$184 billion.

Source: UNECE/FAO TIMBER database, 2012.

The total value of the top five trade flows of woodpulp reached \$60.95 billion in 2009-2010, up 5.1% from 2008-2009. Ongoing expansion of Asian paper and paperboard capacity, especially in China, as well as higher prices in 2010, continued to be reflected in the improvement of all indices relative to 2006 (graph 8.1.2).

GRAPH 8.1.2

Top five global trade flows of woodpulp by value, 2006-2010



Note: Total value of imports for 2009-2010 was \$60.95 billion.

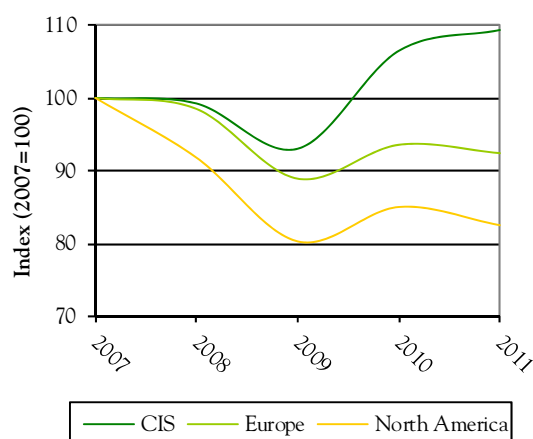
Source: UNECE/FAO TIMBER database, 2012.

Paper and paperboard consumption in the UNECE region was lower in 2011 than during 2010, as producers in Europe and North America suffered from competition from digital media including Internet-based advertising, lower newspaper circulation and page counts, e-books and e-readers, which resulted in curtailed production and more often than not, entire mill closures. Consumption

has continued to increase in the Commonwealth of Independent States (CIS) (graph 8.1.3).

GRAPH 8.1.3

Consumption of paper and paperboard in the UNECE region, 2007-2011



Source: UNECE/FAO TIMBER database, 2012.

While expansions of pulp capacity in South America, and paper, tissue and paperboard continue to flourish in China, closures and conversions to value-added grades are an ongoing focus to maintain a healthy manufacturing base in North America and Europe, two main economic regions that have for decades lost out to lower-cost producers in emerging markets.

To meet China's growing demand for quality virgin pulp for paper and paperboard expansions, including new tissue mills, Chinese entrepreneurs are investing in once-idled or financially distressed mills in the US and Canada, as well as in France, and thereby lowering costs. However, not all mills and their surrounding communities have been fortunate enough to have been the recipients of direct foreign investment from Chinese conglomerates such as Asia Pulp & Paper (Sinar Mas Group) or International Grand Investment.

A rapidly growing market for virgin woodpulp imports into China in the last 20 years has allowed several mills around the world to remain in business, as markets in Europe and North America slowly dwindle. But virgin pulp is not the only fibre-based product experiencing tremendous growth in demand from China. Recovered papers, which in 2011-2012 in Europe and North America may make up 50% of the fibre used in the production of paper and paperboard, have also seen considerable growth in demand. As a result, price volatility has ensued.

The fallback position for many pulp, paper and paperboard producers has been to develop strategies to move into value-added products, reduce costs, while at the same time trying to adopt sustainability initiatives

that will create a symbiotic relationship between pulp and paper market development and the green economy.

In 2011, investments were made globally in dissolving pulp that essentially will lead to a 100% growth in industry capacity in a matter of a few years. This move to value-added products has not only come from Europe and North America, but from innovative producers in the pulp industry who have recognized the economic benefit of developing such an industry and maximizing the potential of their forest resource.

As massive investment into capacity expansion in China in particular continues, the focus of innovation and efficiency will be at the forefront of many industry players' corporate strategy. In this chapter, we look at some noteworthy examples of the industry's challenges and its contribution to the green economy and sustainable development in the UNECE region.

8.2 Europe subregion

The results for the European pulp and paper industry during 2011 were affected, particularly in the second half of the year, by the slowing down of the EU economy. Paper and board production decreased by 0.6% over 2010, when there had been a significant recovery compared with 2009. The 2007-2009 period saw a cumulative drop of 10%. Demand for paper in Europe fell by 1.2% and internal deliveries of paper and board decreased by 2.2%.

In Central and Eastern Europe, the overall situation of the pulp and paper sector remains more or less the same as in 2010. Uncertainty best describes what the industry is experiencing. Most of the sector shows a slight improvement over 2010 and was recovering some of the ground lost in 2009.

8.2.1 European paper and board production decreases 0.6% with an operating rate of 90.4%

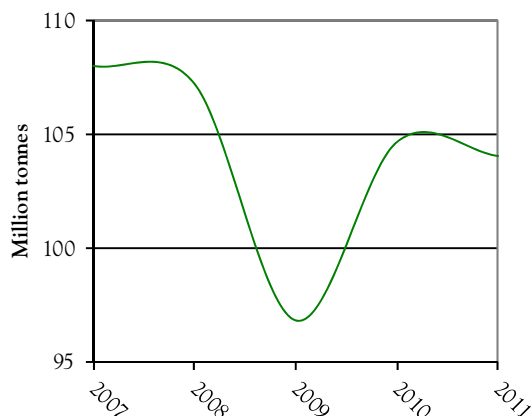
Production of paper decreased by 0.6% in 2011 compared with 2010 (graph and table 8.2.1). Paper production capacity did not change as much as actual production, which means that the operating rate for 2011 was 90.4%, which is 1.3 points lower than in 2010. There has been a reduction in the number of mills in production. In 2011, more than two million tonnes of production capacity – essentially in the graphic sector – closed in Europe, due to the crisis and the resulting overcapacity, while the arrival of new production capacity on the market was dramatically reduced. This "bearish" evolution was also observed in most of the "heavy" industry sectors and appears close to that of European manufacturing overall.

In Central and Eastern Europe, newsprint and magazine paper overcapacity appears to be critical; and

despite the fact that there has been consolidation, further steps are required to make the region globally competitive.

GRAPH 8.2.1

Production of paper and paperboard in Europe subregion, 2007-2011



Source: UNECE/FAO TIMBER database, 2012.

TABLE 8.2.1

Paper and paperboard consumption in Europe, 2010-2011
(1,000 tonnes)

	2010	2011	Change %
Europe			
Production	104 679	104 066	-0.6
Imports	56 723	54 998	-3.0
Exports	66 566	65 390	-1.8
Net trade	9 843	10 391	
Apparent consumption	94 836	93 675	-1.2
of which: EU27			
Production	94 364	94 138	-0.2
Imports	51 887	50 188	-3.3
Exports	63 543	62 518	-1.6
Net trade	11 656	12 330	
Apparent consumption	82 709	81 808	-1.1

Source: UNECE/FAO TIMBER database, 2012.

8.2.2 Paper production decreases in the graphics and packaging sector but increases for tissue grades

Only sanitary and household papers saw an increase in production in 2011 over 2010. Overall output of graphic grades including newsprint fell by 1.2%. Production of newsprint fell by 0.3%. Production of uncoated woodfree

grades increased by 1.0%, whilst coated woodfree grades fell by 6.5%. This result is that the output of woodfree graphics decreasing by 4.8%.

Production of uncoated mechanicals decreased by 5.4% and coated mechanical grades by 0.5%. Overall, the output of mechanical graphic grades was down by 1.3% over 2010. Production of coated graphics fell by 0.9%, and output of uncoated graphics decreased by 2.9% when compared to 2010. The operating rate for graphic papers in 2011 is calculated to be 89.7% (91.2% in 2010). Graphic grades represented 45.2% of all paper and board produced in Europe in 2011 (45.5% in 2010).

In the packaging sector, production decreased by 0.4%. Output of case materials, which represents 56.9% of the packaging sector in terms of production, decreased by 0.1%. Because only tonnage variations are being measured it should be noted that these volumes are affected by the continuing trend towards lighter basis weights.

The output of cartonboard fell by 2.4% and production of wrappings decreased by 0.4%. Production of all other packaging grades fell by 0.9%. The operating rate for packaging papers in 2011 is calculated to be 90.6% (92.7% in 2010). Packaging grades represented 45.0% of all paper and board produced in Europe in 2011.

In contrast to the majority of other grades, output of sanitary and household papers increased by 2.3%. Sanitary and household papers represented 7.3% of all paper and board produced in Europe in 2011 (7.0% in 2010). Production of industrial and specialty grades fell by 0.3%. Industrial and specialty grades represented 4.5% of all paper and board produced in Europe in 2011 (4.4% in 2010).



Source: Metsä Group, 2012.

8.2.3 European paper and board consumption declines by 1.8% in 2011

Consumption of paper and board in 2011 fell by 1.2% compared with 2010 (table 8.2.2). To put this in some context, overall GDP at current prices increased by 1.6% (source: Eurostat – EU27). The manufacture of articles of paper and board saw its activity declining by 1.3%.

There was an overall 3.1% decrease in consumption of graphic grades when compared with 2010, due to flagging investment in advertising, competition from new communication media and constant erosion in newspaper readership. The printing sector (other than newspapers) saw its activity contract by 1.6% over the same period.

Imports of graphic grades fell by 4.1% and exports to countries decreased by 1.5%. The consumption of newsprint increased by 0.9% when compared with 2010. Demand for uncoated mechanical grades fell by 8.1%, and demand for coated mechanical grades fell by 3.1%. Consumption of coated woodfree grades fell by 5.6% and demand for uncoated woodfree grades fell by 8%. This means that overall demand for coated grades fell by 4.3% and uncoated grades decreased by 4.8%.

Consumption of mechanical grades fell by 3.2% whilst consumption of woodfree grades fell by 5.7%. Graphic grades represented 39.5% of all paper and board consumed in Europe in 2011 (40.3% in 2010).

Demand for packaging grades rose by 0.2% compared with 2010. Imports from outside CEPI declined by 1.1% whilst exports decreased by 2%. The manufacture of corrugated paper and board and of containers of paper and board declined by 0.3 % in 2011 while the industrial production rose by 3.2% and retail trade fell by 0.1% over the same period. Among the packaging grades, consumption of case materials rose by 0.6% while cartonboard consumption increased by 1.4%. Demand for wrappings fell by 3.4% and consumption of other paper and board for packaging decreased by 4.4%. Consumption of corrugated grades accounted for 58.5% of all paper packaging materials used and packaging grades in total represented 44.4% of all paper and board consumed in Europe in 2011 (44.2% in 2010).

Demand for sanitary and household grades was flat. Imports declined by 18% and exports decreased by 3.1%. Sanitary & household grades in total represented 8.4% of all paper and board consumed in Europe in 2011 (8.0% in 2010).

TABLE 8.2.2
Paper and paperboard in Europe
(Million tonnes)

	Production					Apparent consumption				
	2007	2009	2010	2011	Change % 2010-2011	2007	2009	2010	2011	Change % 2010-2011
Paper and paperboard	108.0	96.8	104.7	104.1	-0.6	101.4	90.1	94.8	93.7	-1.2
Graphic papers	50.9	42.1	44.9	44.4	-1.2	45.7	37.6	38.2	37.0	-3.1
Newsprint	10.8	8.9	9.6	9.5	-0.3	12.2	9.8	9.4	9.4	0.9
Uncoated mechanical	8.8	7.8	7.9	7.5	-5.4	6.8	6.4	6.4	5.9	-8.1
Uncoated wood-free	10.1	9.1	9.2	9.3	1.0	10.0	8.5	9.3	8.6	-8.0
Coated papers	21.1	16.3	18.2	18.0	-0.9	16.5	12.9	13.2	13.2	0.3
Sanitary and household papers	7.1	7.7	8.0	8.2	2	6.6	7.6	7.8	7.8	0
Packaging materials	45.1	42.8	47.0	46.8	-0.4	43.9	40.5	43.9	44.0	0.2
Case materials	26.3	24.2	26.7	26.7	-0.1	26.2	24.5	26.6	26.8	0.6
Folding boxboard	9.9	9.1	10.0	9.9	-0.7	9.8	7.7	7.9	8.0	1.4
Wrapping papers	4.8	4.2	4.6	4.5	-0.4	3.9	3.6	3.9	3.8	-3.4
Other papers mainly for packaging	4.2	5.2	5.8	5.7	-0.9	4.0	4.7	5.4	5.3	-1.0
Other paper and paperboard	4.9	4.3	4.8	4.7	-2.2	5.2	4.5	5.0	4.9	-1.2

Source: UNECE/FAO TIMBER database, 2012.

8.2.4 *Exports decline while imports increase, but trade balance remains overwhelmingly positive*

Total paper deliveries fell by 0.6% in 2011 compared with 2010, with exports of paper outside Europe accounting for 18.4% (18.1% in 2010). Deliveries to Asian markets increased by 7.0% at 5.5 million tonnes, representing a further 30.4% of exports (28.3% in 2010). Deliveries to North America decreased by 5.3% and represented 10.8% of total exports, compared with 18.5% that region accounted for in 2004.

Imports of paper rose by 1.2% and contributed 5.6% of total European paper consumption in 2011 (5.4% in 2010). Imports from North America accounted for 38.8% of all imports (40.9% in 2010) and decreased by 4.0% in 2011. Imports from Asia fell by 16.7% and accounted for 11.5% of all imports (14.0% in 2010). Europe maintained an overall positive trade balance (exports exceeding imports) in paper in 2011.

It is also important to report on the EU's adoption of anti-dumping measures in 2011, and a European first: anti-subsidy measures against China and its exports of coated wood-free paper. These measures, which will apply for a five-year period, combined with measures previously taken by the United States, have had a significant impact on Chinese exports.

8.2.5 *Pulp production remains unchanged with an operating rate of 87.7%*

Output of pulp remained virtually unchanged with a total output, of both integrated and market pulp (table 8.2.3). Exports of pulp to Asia increased by 40.2%, representing the main destination (74.2%).

Market pulp production rose by 1.8% compared with 2010 (33.0% of total pulp production, 32.7% in 2010). Chemical pulp for sale on the open market represents 94% of all market pulp. Output of this grade rose by 3.0% compared with 2010. These developments can be explained by the closure of integrated paper production units, mainly in the graphic sector, which requires virgin wood fibres. This made it possible to free up market pulp capacities, which grew sharply in Finland and to a lesser degree in Germany and Spain, to benefit from growing markets and lucrative prices.

Total production of chemical pulp rose by 1.2%. Total production of sulphite pulp decreased by 2.5% whereas total output of sulphate pulp rose by 1.5%. Production of both mechanical (-2.3%) and semi-chemical pulp (-5%) decreased.

Production in the first quarter of 2012 fell by 3.6% over the same quarter of the previous year. Total pulp production for that quarter was 2.8% below the level reached over the same period of 2011.



Source: UPM, 2012.

8.2.6 *Trends in raw materials used for pulp production in Europe*

Despite the specificities associated with each kind of wood and each country – these markets being rather regional – the price rise movement that has taken place in Europe since the end of 2009 for the majority of softwood and hardwood species for pulp manufacturing, went on through 2010 to reach a high-point mid-2011. The growing competition of “wood for energy” is also visible, which is widely encouraged and subsidized by public authorities within the context of their projects to promote bioenergy.

In central and eastern Europe, the wood supply situation parallels the trends found in the rest of Europe. There were no significant natural disasters in this part of Europe in 2011. While the lack of storm damage is good for forestry, the storm salvage from recent years helped with the availability of wood for the pulp and paper sector.

The European Union's common policies in many areas also have an influence on wood availability. Continuous pressure on environmental issues reduces forest areas suitable for active sustainable forestry management. The administrative burden placed on forest owners reduces the willingness to harvest their forest resources, which is further magnified by the fact that many forest owners are not dependent on forestry activities for their income.

Policies related to “green energy” production are bringing positive effects for some forest owners by improving their total potential revenues. But this also leads to consumption of the wood directly as fuel. Instead of focusing on market-based added value and cascaded use of wood (energy at the end of the wood product lifecycle), wood energy production is subsidized, driving up the costs of wood fibre.

The wood-working manufacturers feel that they are put at a disadvantage, with arguments related to the need to provide incentives to build and feed a wood energy sector in order to meet EU renewable energy targets. This

is perhaps one more contributing factor to why the wood-working industry is slowly moving out of Europe, with capacity added in other parts of the world (where environmental control is not as strict).

With regard to tariffs on imports of Russian wood, a solution is at hand following the announcement of the Russian Federation's accession to WTO. As of 2012, this solution will take the form of a quota in the range of 9 million m³ benefiting from reduced duty for European companies. The shrinkage in Russian wood exports had provoked numerous tensions with the EU, in particular in Finland whose production capacities were severely affected.

8.2.7 Pulp consumption decreases by 3.2%

Overall consumption of pulp fell by 3.2% (table 8.2.3). Imports of pulp from outside Europe rose by 1.4%, with primary sources remaining Latin America (62.8%) and North America (27.8%).

Consumption of mechanical and semi-chemical pulp decreased by 3.1%, while consumption of chemical pulp decreased by 3.2% over 2010.

After the steep rises of 2009 and the high levels reached by mid-2010, the first half of 2011 appeared relatively stable. The second half, on the other hand, showed marked drops. Prices for eucalyptus pulp (hardwood) more than doubled between mid-2009 and mid-2010 to come close to the records reached in 2000. The drop that followed was in the 30-35% range.

For softwood pulp, comparable hikes were likewise observed for the mid-2009 to mid-2010 period. The weakness of the US dollar even pushed prices to the record level of more than \$1,000 per metric tonne in June 2011. Drops in the range of 20% were observed towards the end of 2011.

The economic slowdown of the main economies in the middle of the year, the speculative behaviour of Chinese buyers, stock movements among producers and merchants, and exchange rates volatility can explain most of these “yo-yo” movements, which can also be observed on most raw materials markets.



Source: Stora Enso, 2012.

TABLE 8.2.3
Woodpulp balance in Europe, 2010-2011
(1,000 tonnes)

	2010	2011	Change %
Europe			
Production	39 252	39 335	0.2
Imports	18 190	17 877	-1.7
Exports	12 373	13 597	9.9
Net trade	-5 817	-4 279	
Apparent consumption	45 069	43 614	-3.2
of which: EU27			
Production	36 900	37 074	0.5
Imports	16 806	16 673	-0.8
Exports	11 738	12 955	10.4
Net trade	-5 068	-3 718	
Apparent consumption	41 968	40 792	-2.8

Source: UNECE/FAO TIMBER database, 2012.

8.2.8 Paper for recycling utilization in Europe decreases 1.2%; prices take off

Utilization of paper for recycling decreased by 1.2% in 2011 compared with 2010.

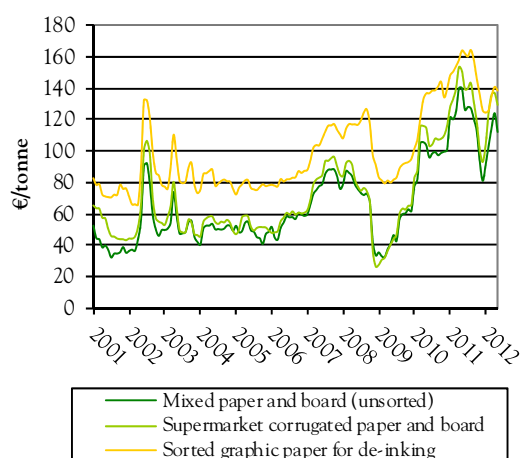
Collection increased by 0.2%. Exports of paper for recycling increased by 5.5% with 97.5% of non-European destinations being sent to Asian markets. Paper for recycling represents 44.5% of the fibre used in papermaking and 40.3% in woodpulp.

Recovered paper accounts for more than half of the fibres used for paper and paperboard production in Europe and prices are extremely volatile. Between the beginning of 2009 and the beginning of 2011, recovered paper prices tripled, and even quintupled for low-quality grades. This was followed by a plummeting of recovered paper prices until the end of 2011. The drop had been in the order of 40% for a major part of the grades (graph 8.2.2).

High-quality grades – substitutes to virgin fibre pulp – saw similar but less dramatic variations. Turbulences in western economies and the growing appetite of the Chinese paper and paperboard industry for recovered paper, combined with speculative purchasing behaviours, explain most of these developments.

GRAPH 8.2.2

Average recycled paper prices, 2001-2012



Notes: Product code for mixed paper and board (unsorted) is 1.01, for supermarket corrugated paper and board 1.04 and for sorted graphic paper for de-inking 1.11.

Source: CEPI, 2012.

8.2.9 Environmental focus remains key driver as European paper industry launches “Roadmap 2050”

Questions concerning climate change, energy efficiency, the development of bio-energies and raw materials remain crucial for the paper industry. The necessary reduction of greenhouse gases, the growing promotion of bio-energies, the need to assure the availability of raw materials (wood and recovered paper) and competition for the use of land are widely debated in Brussels, but also in numerous capitals around the world. These subjects, which are too often only perceived as threats for the development of entire sections of western economies, can nevertheless hold numerous opportunities for the paper industry. The industry could boast of being part of the “bio-economy” with its renewable and recyclable raw materials – which in addition are carbon sinks – along with its leadership in terms of bio-energy.

The European paper industry is showing the way with the launch of its “2050 Roadmap” at the end of 2011 (Unfold the Future, 2011). This initiative describes the future of a sector where it should be possible to reduce emissions by 80% and to increase the added value of products – which are more and more diverse, ranging from paper to bio-chemistry and bio-fuels to nano-cellulose – by 50%, thanks to a higher value given to its raw materials and residues. Efforts in the fields of research and innovation will therefore be crucial in the years to come.

8.3 CIS subregion, focusing on the Russian Federation

8.3.1 Russian Federation output of pulp, paper and paperboard

The slump in production and demand for pulp and paper products in the Russian Federation from the second half of 2008, as a result of the global economic crisis, continued in 2011 (table and graph 8.3.1).

During 2009, which was the first full year after the global economic crisis, the country’s total output of pulp (both pulp for paper and paperboard and market pulp) decreased by 7.5%, the output of market pulp decreased by 11.9%, and the total output of paper and paperboard decreased by 2.9%.

TABLE 8.3.1

Output of chemical woodpulp, paper and paperboard in the Russian Federation, 2010-2011

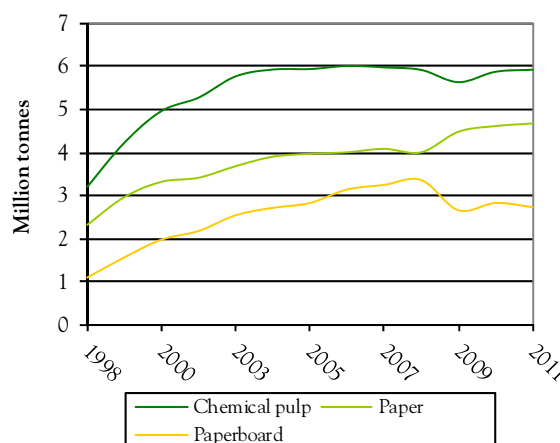
(1,000 tonnes)

	2010	2011	Change %
Chemical woodpulp	5 870	5 918	0.8
Paper	4 612	4 672	1.3
Paperboard	2 829	2 734	-3.4

Source: UNECE/FAO TIMBER database, 2012.

GRAPH 8.3.1

Output of pulp, paper and paperboard in the Russian Federation, 1998-2011



Sources: Goskomstat of the Russian Federation, PPB-express, Moscow, author’s estimates, 2012.

8.3.2 Commonwealth of Independent States and the Russian Federation balance of trade

Paper and paperboard production in the CIS rose by 1.7% in 2011 against 2010 to 9.91 million tonnes, while exports fell by 2.1% to 2.79 million tonnes. Imports rose

1.3% to 2.92 million tonnes, partly as a result of excess capacity from western Europe (table 8.3.2). Apparent consumption of paper and paperboard rose 2.7% in 2011 against 2010 to 5.61 million tonnes.

TABLE 8.3.2
Paper, paperboard and woodpulp balance in the CIS,
2010-2011
(1,000 tonnes)

	2010	2011	Change %
Paper and paperboard			
Production	9 745	9 912	1.7
Imports	2 886	2 922	1.3
Exports	2 847	2 786	-2.1
Net trade	-39	-136	
Apparent consumption	9 784	10 048	2.7
Woodpulp			
Production	7 427	7 413	-0.2
Imports	202	232	14.9
Exports	1 870	2 035	8.9
Net trade	1 668	1 803	
Apparent consumption	5 759	5 609	-2.6

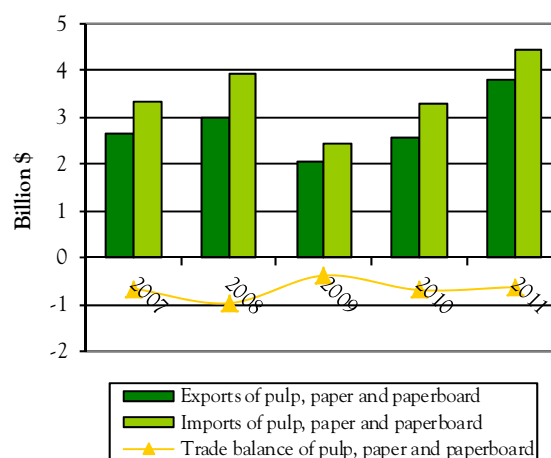
Source: UNECE/FAO TIMBER database, 2012.

Woodpulp production edged lower by 0.2% to 7.41 million tonnes, while exports rose 8.9% to 2.04 million tonnes. Imports rose by 14.9% to 232,000 tonnes as competition from European producers heated up on lower demand in that market following paper-machine closures and downtime. Net trade reached 1.80 million tonnes in 2011, an 8.1% improvement over 2010.

Pulp and paper products hold an important position in the total of Russian forest product exports. Although the tonnage of Russian paper and paperboard exports greatly exceeds the tonnage of imports, the trade balance in terms of value is negative, as the Russian Federation has increased imports of higher value paper products. The annual trade deficit in paper and paperboard is negative (graph 8.3.2). The higher value of imports of paper and paperboard, as compared to their exports, is mainly due to the fact that the Russian Federation is importing expensive products, such as high-quality materials for container and packaging, coated paper, and tissue; whereas less expensive commodity products such as newsprint and kraft-linerboard are being exported. Recently, however, capacity for higher-value products has been added in areas such as tissue paper and quality writing paper.

GRAPH 8.3.2

Russian Federation exports and imports of pulp, paper and paperboard, 2007-2011



Sources: State Customs Committee, "Pulp. Paper. Board"-Magazine. PPB-express, PPB Exports, PPB Imports, author's estimates, 2012.

The major export destinations for Russian pulp and paper products are: China (market pulp, kraft linerboard), Ireland (market pulp, kraft-linerboard), India (newsprint) and Turkey (newsprint). Although export of paper and paperboard has fallen recently, market pulp has gained much of the ground it lost in 2009 (graph 8.3.3).

In October 2006, an alliance was formed between "International Paper" and "Ilim Pulp Enterprise" – the "Ilim Group". In October 2007 the Ilim Group started implementing some major investments, including a project initiated in 2009, the Kotlas semi-chemical pulp mill – a neutral sulfite semi-chemical pulp plant with a capacity of 900 tonnes a day.

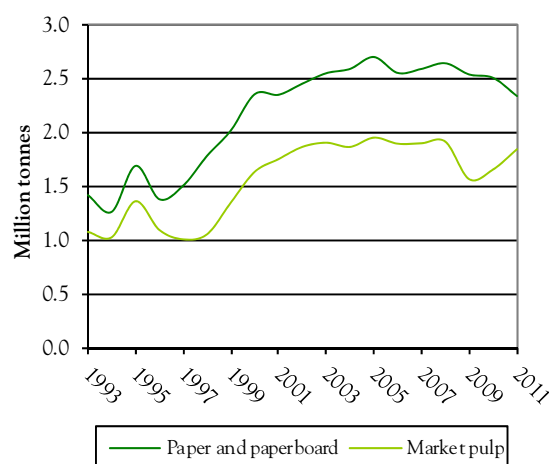
The reconstruction and restructuring of the Russian pulp and paper industry is continuing, with some progress being made towards higher value products with better processing of wood raw material.



Source: Metsä Group, 2012.

GRAPH 8.3.3

Exports of market pulp, paper and paperboard from the Russian Federation, 1993-2011



Sources: Goskomstat of the Russian Federation, PPB-express, Moscow, author's estimates, 2012.

8.3.3 Russian pulp and paper industrial movements toward sustainable forest products

Implementation of major environmental projects provides examples of steps being taken towards applying the new Russian environmental laws adopted in late 2002. For instance, new systems of wastewater treatment were constructed at the International Paper mill in Svetogorsk. Furthermore, in connection with the ratification of the Kyoto Protocol, a number of mills initiated work on inventorying greenhouse gas emissions and improving the efficiency of their boilers by reducing emissions and by utilizing renewable wood-based energy.

8.3.4 Policies for research and development in the Russian pulp and paper sector

The revival of science is important to move the Russian pulp and paper industry onto an innovative development path and to capitalize on the competitive advantages of the Russian forest sector. Unique forest resources, strong northern fibre, qualified technical personnel and investment programmes of the world's largest companies create the preconditions for accelerated innovation, expansion of potential exports, import substitution based on the interaction of Russian and European Forest Technology Platform for priority support of Bio-Refining, nano-technology, energy and water savings. The mechanism of interaction between Russian Platform "BioTech 2030" and the European Forest Technology Platform can be effectively used in this direction.

8.3.4.1 Connection between Russian and European Forest Technological Platform

A symposium was held on 31 May and 1 June 2012. "EU-Russia: Cooperation in the field of biotechnology". The symposium provided a venue for discussion between European and Russian experts on the recently adopted programme for biotechnology development in Russian Federation, "BIO 2020". This programme also marks a new stage in Russian economic development and would serve as an effective basis for knowledge-based bio-economy formation. It will also enhance EU-Russian cooperation in the field of biotechnology.

There are a number of areas, fully matching the European and the Russian Forest Technology Platform:

1. Tailor-made wood supply.
2. Enhanced biomass production.
3. Cascade use of renewable materials.
4. Forest ecology and ecosystem services.
5. Multi-purpose use of forests.
6. Building with wood.
7. New bio-based products.
8. Smart packaging solutions.
9. Integration of new solutions in printed products.
10. Sanitary and household and healthcare products.
11. Resource efficiency improvements in manufacturing.
12. Sustainable water systems.
13. Zero waste pulp and paper value chain.
14. Biorefinery concepts.
15. Renewable energy solutions.
16. Bioenergy products.

8.3.5 Public-Private Partnership for Innovation in the Forest Industry

The Larch Project, which was discussed in the 2010-2011 *Market Review*, is a joint project of OJSC Ilim Group and St. Petersburg State Technological University of Plant Polymers. It is the first example of its kind for public-private partnership in the Russian forest industry. The project is co-financed by the Russian government in the amount of RUR 150 million provided that OJSC Ilim Group invests the same amount.

Larch makes up 31% of the growing stock in the Russian Federation (more than 75% in eastern Siberia). The tree has strong and dense wood which has a specific chemical composition. Unlike larch trees that grow in North America and Western Europe, Siberian and Dahurian larch wood contains 7%-30% of a water-soluble polysaccharide arabinogalactan. It cannot, therefore, be pulped using conventional technology.

Existing facilities are being retooled for larch (at Bratsk and Ust-Ilimsk Mills) and new facilities are also planned. The potential annual harvest capacity for larch in the Russian Federation (Siberian and Dahurian larch) is 105 million m³, with a prospect of over 1.3 million m³ for Ilim Group.

The Larch Project is a possibility for the Russian forest industry to make a conceptual step forward in using the vast resources of Siberia and the Far East. In practical terms, the project implies a dramatic change in the existing affordably accessible forest resources base. New innovative technologies will be created to launch integrated processing of larch wood (including new grades of marketable pulp, construction and composite materials and other high valued products).

8.3.6 Outlook for the future

Sustainable development of the Russian forestry sector is of both national and global environmental importance. The country possesses almost one quarter of the world's forest resources. Among the countries of the Northern Hemisphere, the Russian Federation has huge untapped forest resources and tremendous potential for applying its scientific and engineering capacity for developing the forestry sector using state-of-the-art solutions to produce sustainable forest products, including pulp and paper, within the next few decades. In this context, the development strategy for the country's Forestry Industrial Complex for the period up to 2020 has assumed vital national and international significance.

8.4 North America subregion

North American paper and paperboard production saw a marginal decline in 2011, while pulp output rose on strong Asian demand. Domestic demand for paper suffered on lower advertising budgets for print advertising, and growing electronic media for data and information, much of which is Internet-based. The result is that 30 mills in North America were forced to close pulp lines or paper machines totalling 5.4 million tonnes in 2011 and the first half of 2012. Pulp and paper mill conversions mainly to higher-value-added pulps continued to be a major focus of the industry.

8.4.1 Production on a roller-coaster ride in 2011-2012, up from 2009 dip

North American market conditions in 2011 continue to be challenging for commodities, as indicated by the latest US monthly price indices for pulp paper and paperboard (graph 8.4.1). Producers continued to fall victim to slowing demand and imports; and overcapacity in newsprint, printing and writing and paperboard led to closures. These were sometimes the result of financial

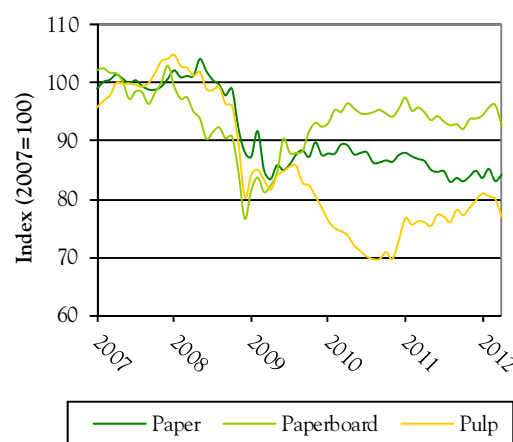
distress including bankruptcy filings which involved Canadian assets, or were due to mergers and acquisitions.

However, pulp prices saw an improvement following strong Asian demand that offset falling or stagnant demand from Europe, North America and Japan. And as downtime was taken by mills that were being converted to value-added grades (Plymouth and Perdue Hill to fluff from paper-grade as examples), other mills simply ran harder or restarted (Old Town).

Chinese chemical market pulp imports in 2011 rose 18% (220,000 tonnes) against 2010. In Q2/2012, unplanned and market-related downtime across pulp and paper segments, and the closure of excess supply in the paperboard segment following recent mergers and acquisitions (Rock-Tenn's purchase of Stone Container and I-P's takeover of Temple-Inland) have led to lower overall pulp production, despite stronger chemical market pulp exports again to China (+38% or 206,000 tonnes more in the January-May period of 2012 than in 2011).

GRAPH 8.4.1

US pulp, paper and paperboard production indices, 2007-2012



Notes: Indices calculated for yearly averages.

Source: US Federal Reserve, 2012.

The data provided by the US Federal Reserve is corroborated by the latest release from the American Forest & Paper Association (AF&PA). In 2011, US paper and board production reached 81.5 million short tons, a 2.6% decline compared with 2010. In Q1/2012, production was down another 0.7% over Q1/2011. Since the recession of 2008-2009, about 7 million short tons (about 7% of the industry's capacity) have not restarted.

In Canada, the closure of over 1.1 million tonnes of newsprint capacity in 2010-2011, representing 18.5% of capacity, and another 560,000 of uncoated groundwood capacity (16.6%), has led to the industry now restructuring (Valois Vision Marketing).



Source: Stora Enso, 2012.

The result of the slower production including closures in Canada and the US was that a handful of companies (New Page, Verso, Catalyst, AbitibiBowater now Resolute Forest, St. Mary's among several others) found themselves in financial difficulty if not in complete bankruptcy protection. In other cases, pulp and/or paper machines were temporarily and sometimes permanently idled.

Fibre input commodities were a mixed bag of results in the last year. Prices for market pulp that had dipped in mid-2011, as demand in general had fallen and consumers destocked, began to rebound in Q1-2012 on record buying levels from China. In 2011, China became the largest market for chemical market pulp, surpassing the 13 million tonnes mark (imports and domestic production). As for recovered paper, prices that had also declined since mid-2011 saw a muted recovery as offshore demand – mainly China – fell, causing what can only be seen as a false start.

Much of the demand recovery for North American fibres was due to restocking by Chinese trading houses and consumers that bought direct from suppliers in the December 2011-March 2012 period. With record volumes of virgin chemical market pulp entering China in the February-March 2012 period, domestic prices fell by \$80-\$100 (12%-15%) a tonne in the May-June 2012 period for Northern Bleached Softwood Kraft (NBSK) and by as much as \$60-\$80 (9%-12%) for Bleached Eucalyptus Kraft Pulp (BEKP) during the same two-month stretch, as there was simply too much supply for the given market. Traders were scrambling to generate sales so as to pay their banks in China for the letters of credit issued by these financial institutions to cover payments made to international pulp suppliers.

Chemical market pulp demand within China and elsewhere to a lesser extent also came as a result of fears that prices would rise in the light of the heavy buying activity in late 2011 prior to the Chinese Lunar New Year (end of January) followed by global maintenance downtime during Q2 that totalled 1,474 million tonnes or 10.0% of world capacity (Valois Vision Marketing). As

a result, market pulp prices in European and US markets began to recover in March and April 2012 respectively; however, by May, the market appeared to peak with Chinese primarily leading the parade for lower commodity pulp prices.

Despite record volumes of pulp entering China, led by massive investment into pulp and paper equipment, the rest of the world did not follow. During 2007-2012, the Chinese pulp and paper industry has built in excess of 53 million tonnes of new, world-class capacity in the sectors of tissue, packaging, printing and writing papers, paperboard, dissolving, high-yield (thermo-mechanical) and chemical pulps and related materials requiring fibre imported from around the world. At the same time it has shuttered older, inefficient and polluting pulp and paper machines that have totalled an estimated 25 million tonnes – machinery that virtually always used annual fibres (reed, bagasse, straw) and that lacked both quality and consistency.

At least another 30 million tonnes of printing & writing, tissue and paperboard capacity has been announced in China for 2012-2016. China's need for fibre will therefore continue to grow, and will do so at a pace that far exceeds that of any other country.

In 2011, China surpassed Japan as the number one global importer of wood fibre (logs and chips); for 20 years or more, Japan had held the number one position, being involved in the transaction (buying end) of 80% of the wood chips sold around the world.



Source: Metsä Group, 2012.

A total of 8.2 million tonnes of pulp and paper capacity was ordered shut by the centralized government in 2011, and in 2012, the figure is another 8.8 million tonnes. The closures represent approximately 17% of published Chinese pulp, paper including tissue, and paperboard capacity in 2011, according to the China Paper Association data. The closures were forced by the authorities as a way to modernize the country's manufacturing base, while at the same time showing the

international community that China cares about the environment.

Compared to US installed capacity in 2011 for these segments of some 81.6 million tonnes according to the AF&PA, the closures are in themselves major at 21.9% of US capacity. In other words, more than one out of every five pulp, paper and paperboard mills closed in the 2011-2012 period. For the US, such closures have meant that since 2009, more than one out of every ten mills has closed. A total of 11.9% or 12.3 million tonnes of pulp, paper and paperboard capacity has been lost.

Paper and paperboard production in North America in 2011 fell 1.0% against 2010 to 89.5 million tonnes, with exports up 7.3% to 23.0 million tonnes. Imports edged higher by 0.7% to 12.9 million tonnes, leaving the apparent consumption at 79.4 million tonnes, a drop of 2.9% against 2010 (table 8.4.1).

TABLE 8.4.1

Paper and paperboard balance in North America, 2010-2011
(1,000 tonnes)

	2010	2011	Change %
Production	90 422	89 493	-1.0
Imports	12 786	12 879	0.7
Exports	21 432	23 005	7.3
Net trade	8 646	10 126	
Apparent consumption	81 776	79 367	-2.9

Source: UNECE/FAO TIMBER database, 2012.

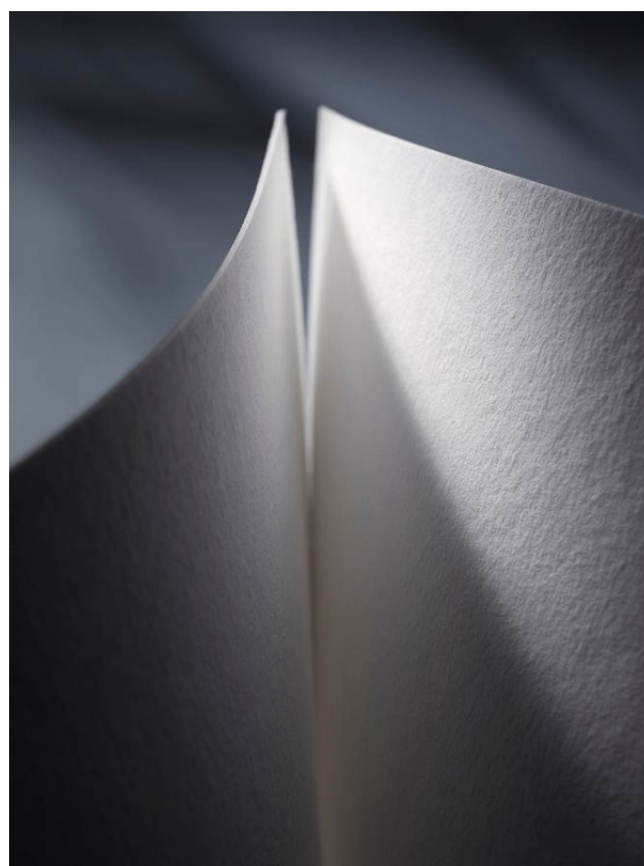
In detail, all graphic paper sub-categories saw production and apparent consumption decline in 2011 against 2010 (table 8.4.2). The largest percentage loss was uncoated mechanical papers production (-8.9%) and apparent consumption (-6.9%). Uncoated wood-free papers, the largest category, experienced a 3.4% decline in production and a drop of 4.3% in apparent consumption.

Sanitary and household papers saw a production increase of 9.7% in 2012 against 2011 to 7.5 million tonnes, as new products such as wipes and environmentally friendly consumer towelling products were heavily marketed. Apparent consumption rose 10.4% to 7.6 million tonnes.

Folding boxboard production (-5.9%) and apparent consumption (-9.8%) in 2011 were reflective of overcapacity and the result of mergers and acquisitions in the North American industry. Case materials and other papers mainly for packaging were also symptomatic of the chronic overcapacity plaguing North American producers.

While the market recovery for chemical market pulp in early 2012 is virtually entirely driven by Asian,

primarily Chinese, demand, a full rebound in paper and paperboard commodity segments is highly doubtful in 2012. European and North American demand for pulp, paper and paperboard has fallen with downstream mill closures or lower print media usage. Simply put, advertising dollars continue to pour out of paper-based budgets and into Internet-based accounts, electronic distribution of documents (letters, bills) continues to flourish as time and money are saved against traditional postal or even courier options, and e-book readers increasingly become the conspicuous shopping item.



Source: Metsä Group, 2012.

All these Internet-based threats to the pulp, paper and paperboard industries are real, and are quickly shaping the landscape. Closures of paper machines in North America in the 2010-2012 period amounted to 7.67 million tonnes (Valois Vision Marketing estimate), or 7.7% of installed capacity (FAO 99.4 million tonnes). As for pulp operations, most changes during the same period occurred as the result of conversion from chemical market pulp to either fluff or dissolving pulps, where global demand has increased 4%-5% and about 10%, respectively, per annum in the 2010-2012 period (Valois Vision Marketing estimates).

TABLE 8.4.2
Paper and paperboard in North America
(Million tonnes)

	Production					Apparent consumption				
	2007	2009	2010	2011	Change % 2010-2011	2007	2009	2010	2011	Change % 2010-2011
Paper and paperboard	101.3	84.2	90.4	89.5	-1.0	96.2	77.2	81.8	79.4	-2.9
Graphic papers	38.5	28.1	29.3	28.0	-4.6	38.6	26.7	27.4	26.0	-5.2
Newsprint	11.1	7.4	7.5	7.3	-1.6	8.6	5.4	4.9	4.7	-3.7
Uncoated mechanical	6.0	4.9	4.9	4.4	-8.9	6.3	4.8	4.8	4.5	-6.9
Uncoated wood-free	11.7	9.0	9.4	9.0	-3.4	11.8	9.0	9.4	9.0	-4.3
Coated papers	9.7	6.8	7.6	7.1	-6.2	11.9	7.6	8.3	7.8	-6.0
Sanitary and household papers	7.4	7.3	6.8	7.5	9.7	7.4	7.3	6.9	7.6	10.4
Packaging materials	50.9	44.6	49.9	50.0	0.2	45.6	38.9	43.0	40.8	-5.2
Case materials	33.5	30.7	32.7	32.7	0.1	30.5	27.4	28.9	28.1	-2.5
Folding boxboard	8.2	6.1	7.3	6.9	-5.9	7.3	5.1	5.9	5.3	-9.8
Wrapping papers	1.7	1.4	4.0	4.7	16.7	1.6	1.2	3.8	4.0	4.2
Other papers mainly for packaging	7.5	6.4	5.9	5.7	-2.9	6.2	5.2	4.4	3.4	-24.3
Other paper and paperboard	4.4	4.2	4.4	4.0	-8.2	4.6	4.3	4.5	5.0	11.4

Source: UNECE/FAO TIMBER database, 2012.

Converted capacity to fluff in North America amounted to 1.02 million tonnes or 6.7% of chemical market pulp capacity. Fluff pulp expansions during the 2010-2012 period would see North American capacity increase by 21.2% to 5.8 million tonnes. For specialty dissolving pulps, the incremental figure would add 443,000 tonnes, or 46.5% of the existing North American industry's specialty dissolving pulp capacity (Valois Vision Marketing estimates).

During the same period, only 375,000 tonnes of chemical market pulp capacity was shuttered indefinitely. This followed a dark period in the industry when 2.78 million tonnes of chemical market pulp (18% of North American capacity) was shuttered during 2005-2009 (Valois Vision Marketing estimates).

Input costs in the 2011-2012 period have risen to the point where price increases for paper are cost-driven and not necessarily because of improved short-term demand. Paper merchants have yet to see a demand recovery, which has cast doubt on the success of price increase announcements for certain printing and writing paper grades in North America and Europe.

North American production of paper and board decreased by 1.0% in 2011 (table 8.4.2). Generally, while North American imports rose by 0.7% in 2011 to 12.9 million tonnes, aided by capacity closures, exports rose by 7.3% due to falling apparent consumption, and a weak US currency.

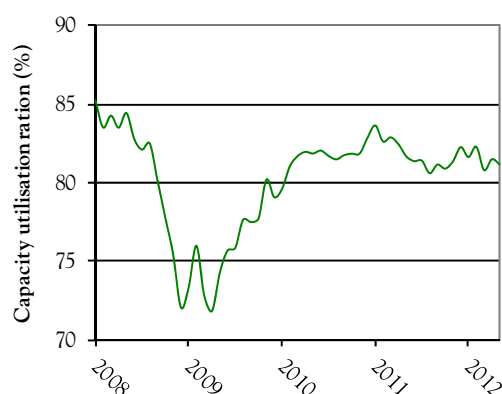
8.4.2 *Output declines as industry rationalizes and consolidates – a sign of things to come*

A rebound in market conditions in 2010 in the US paper industry, a major indicator of North American production trends, following the frail markets and weak pricing in 2008-2009 was reflected in the capacity utilization ratio that hovered just below 85%, up from lows of 72%-73% in late 2008 and early 2009. The rebound was short-lived with lower capacity utilization in much of the second half of 2011 compared with most of 2010. The early indication for 2012 is that the ratio will be consistently below 2011 levels.

US production indices show that output quantities of pulp, paper and paperboard all weakened in the second half of 2011 following a rebound in 2010 and during the first half of 2011 (graph 8.4.2).

GRAPH 8.4.2

US paper industry capacity utilization ratio, 2008-2012



Source: US Federal Reserve, 2012.

Merger and acquisition activity in 2011 in the containerboard sector, closures of market pulp, newsprint, printing and writing papers, and conversions from chemical to fluff or dissolving grades have become a symptom of an industry that is searching for purpose.

Monthly production indices in early 2012 were continuing to trend downwards, reflecting a general industry-wide softening of demand that resulted in ongoing weak commodity prices in the pulp, paper and paperboard sectors. The result was a further move by the industry to shutter excess capacity and/or trim costs.

8.4.3 AF&PA US paper/board 2012 capacity survey – is this the end of the decline?

According to the American Forest & Paper Association's latest survey, US paper/board capacity should rise by 0.6% (517,000 tonnes) in 2013 after falling over the 2000-2012 period by 13.2 million tonnes due to, among other things, consolidation, the great recession of 2008, and electronic media. Of the 13.2 million-tonne decline over the 12-year period, newsprint capacity fell by about 50% to 3.1 million tonnes in 2012, uncoated freesheet fell 35% to 9.0 million tonnes, and coated papers (freesheet and mechanical/wood-containing) declined by 25% to 7.1 million tonnes.

Since January 2009, 18 companies in the pulp, paper and paperboard sectors have filed for bankruptcy. Every sector of the US pulp and paper industry has been hit by consolidation, mainly in containerboard.

One area of hope for many older pulp mills that used to focus mainly on paper grade qualities is dissolving pulp, where North American capacity is expected to rise by 38% in 2013 versus 2012 to 1.3 million short tons.

8.4.4 South American market pulp expansions explode

In the last 20 years, investment in chemical market pulp capacity in Brazil, Chile and Uruguay has increased capacity from less than 4 million tonnes to over 16 million tonnes – no other region has seen such growth. In 1992, Latin America represented 11.8% of world chemical market pulp capacity, whereas in 2012, the figure is 16.7 million tonnes (28.4%). Over the next 10 years, South American chemical market pulp capacity could theoretically add another 30 million tonnes based on already announced projects; no other region is adding anything close to such capacity.

8.4.5 Asian investment continues providing hope to a select few mills

As in previous years, Asia Pulp & Paper, a division of the Sinar Mas conglomerate, continued to acquire pulp and paper mills in an effort to secure fibre at a reasonable price. This strategy was not unlike that of the Japanese in the 1970s-1990s when the fibre-poor country invested abroad to secure wood fibre and pulp for their domestic mills. In 2011, Paper Excellence Canada Holdings (PECH) acquired Howe Sound Pulp & Paper, British Columbia, Domtar's Prince Albert, Saskatchewan NBSK market pulp and uncoated freesheet mill, and Northern Pulp's mill in Pictou, Nova Scotia.

Prior to 2011, PECH had acquired mills in Meadow Lake and Mackenzie. International Grand Investment, another Asian-based company, in 2010 bought the Woodland (ME, USA) NBHK pulp mill. Paper Excellence (US) a subsidiary of APP, acquired a pulp mill in Halsey (OR, USA). Without these major asset purchases from Asian investors, the potential loss of output within the North American pulp and paper industry would have been even higher.

8.4.6 Environmental focus and greener energy

In North America, local and federal governments are "gently pushing" consumers, retailers and industry to reduce or even eliminate the use of plastic or non-recyclable shopping bags in some municipalities and cities, and move away from their high dependency on non-renewable energy sources such as oil. And at the municipal level, governments across Canada and the United States, are forcing compliance to clean-air acts and pollution controls.

8.4.7 Nano-cellulosic technology moves into commercialization

Domtar has developed nano-cellulosic fibre technology over the last few years and has managed to begin commercialization of this new and remarkable fibre to highly specialized end-use applications in the four main

industrial sectors of paints and coatings, films and barriers, textiles and composites located across Canada, the United States, Europe and Asia.

8.4.8 *Internet-based or digital advertising seen as an ongoing threat for newspapers' print medium revenue streams (advertising and classifieds)*

Since the mid-1990s, with the loss of advertising revenues to digital media across the wide range of Internet offerings – from magazines to newspapers, from radio to television – the Internet has transformed the advertising world in such a way that print media of all sorts are scrambling for a place in an ever-changing world. In 2011, according to the Pew Center's Project for Excellence in Journalism, US newspapers lost \$10 in print advertising revenue for every \$1 they gained in online advertising revenue.

8.4.9 *Chinese coated paper CVD and ADD – will they stay or will they go?*

In September 2009, the US Department of Commerce began an investigation into imports of coated paper sheets from China. The largest impact was felt by China where countervailing duties and anti-dumping duties were imposed on major players after a six-month investigation. While these duties effectively shut out these Chinese coated paper exporters from the US market, other countries – namely Japan and regions including Europe – moved in and saw their market shares increase significantly. For Japan and the Republic of Korea, their share of the US coated paper sheet market rose from a combined 13% to 24% over the 2009 to 2010 period. European suppliers saw theirs grow from 8% to 15%, while US domestic suppliers saw their share rise by only 9% to 57% after the duties had been imposed. China's market share fell from 22% to 2%.

8.5 References

Note: The Review has a statistical annex, which is available at: www.unece.org/fpamr2012

- American Forest & Paper Association. 2012. Press releases and industry statistics. Available at: www.afandpa.org/ and www.statmill.org/
- Confederation of European Paper Industries (CEPI). 2012. CEPI Preliminary Statistics 2011. Available at: www.cepi.org/
- Federal State Statistics Service. Goskomstat of the Russian Federation. 2011. Available in English at: www.gks.ru/wps/wcm/connect/rosstat/rosstatsite.eng/
- Foex. 2012. Available at: www.foex.fi
- PPB-Express, PPB Exports, PPB Imports, Pulp Paper Board (PPB) magazine (of Russia). 2011. Available at: www.cbk.ru/eng/cbk_mag.php
- UN COMTRADE database. 2012. Available at: www.comtrade.un.org
- Unfold the Future. 2011. Available at: <http://www.unfoldthefuture.eu/>
- UNECE/FAO TIMBER database. 2012. Available at: www.unece.org/timber/
- US Federal Reserve. 2012. Price indices and Utilization ratios. Available at: www.federalreserve.gov/econresdata/statisticsdata.htm
- Valois Vision Marketing. 2012. Pulp Mill Closures & Conversion Study 2012; China Study, 2012; Supply-Demand Analysis (2012-2022), June 2012. Available at: www.valoisvision.com/products/