

PaperAge

JANUARY/APRIL 2023

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**Suzano's
Walter Schalka
Executive Papermaker of the Year**



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Measurable and Lasting Change

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As you may have noticed by the front cover, PaperAge has named Suzano's CEO, Walter Schalka, as our 36th Executive Papermaker of the Year. We select our Executive Papermaker based on corporate vision, strategic objectives, and strong leadership within the individual's company and on behalf of the paper industry as a whole.

Mr. Schalka has served as CEO of Suzano since January 2013, and he has played a strategic role in the evolution of the company's results in recent years, including the combination between Suzano Pulp and Paper and Fibria Celulose in January 2019.

There are many reasons we selected Mr. Schalka. From a strictly business standpoint, Suzano reported best ever results in 2022. "The combination of good volumes in terms of sales and better prices lead us to a situation that we had the best EBITDA ever in the company," Mr. Schalka said.

The company's "Cerrado Project" in the municipality of Ribas do Rio Pardo, in Mato Grosso do Sul, Brazil, is about 50% complete and is on time and on budget. The new \$2.8 billion eucalyptus pulp mill will have an annual production capacity of 2.55 million tons and is one of the largest private sector investments currently under development in Brazil.

And Suzano is in the midst of increasing its share in Brazil's tissue market with the acquisition of Kimberly-Clark's tissue business in Brazil. As of this writing, Suzano expects final regulatory approval in mid-April. The acquisition will increase Suzano's presence in the country's tissue market from 11% to around 22-25%.

In addition, Suzano has plans to build a tissue mill with converting operations in the municipality of Aracruz, Espírito Santo, Brazil. The new plant will have the capacity to produce 60,000 tons per year of tissue.

Suzano also has significantly increased ownership of forest assets near its mills to address future fiber needs and reduce transportation costs and the environmental impact created from trucking eucalyptus logs over long distances.

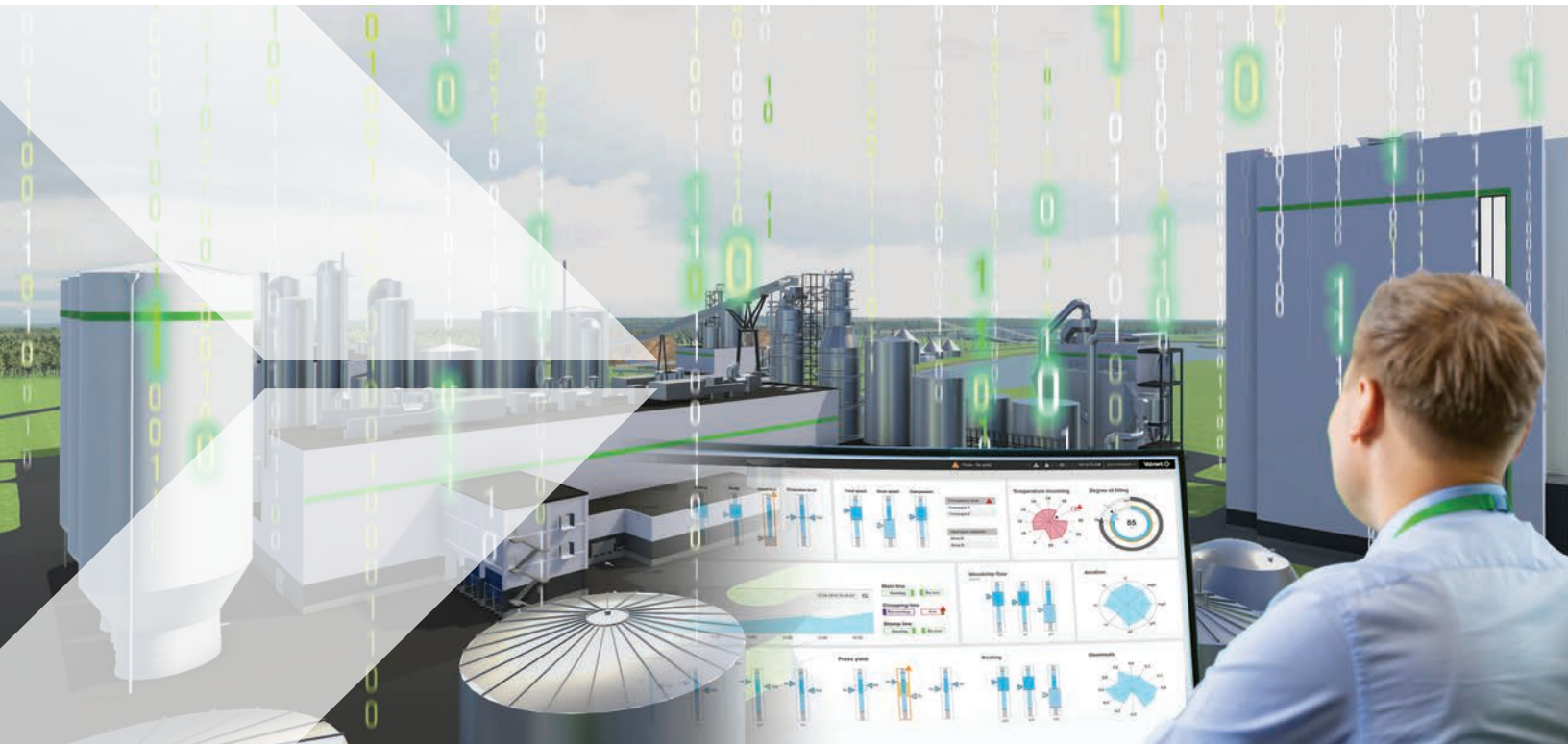
As impressive as Suzano's strategic business dealings have been, Mr. Schalka's unwavering passion to see Suzano grow in an environmentally responsible way — while influencing other large companies to do the same — stands out even more.

Suzano, along with Itaú Unibanco, Marfrig, Rabobank, Santander, and Vale have created a company called Biomas, which is dedicated to the restoration, conservation, and preservation of forests in Brazil. The objective of the initiative over 20 years is to reach a total restored and protected area of 4 million hectares of native forests in different Brazilian biomes, such as the Amazon, Atlantic Forest, and Cerrado.

Recently, the Brazilian-American Chamber of Commerce announced Mr. Schalka as the Brazilian recipient of the 2023 Person of the Year Award. Among other accolades, the Chamber noted, "His commitment to ESG — particularly in the areas of climate change, biodiversity, and social development — is admirable and has brought about measurable and lasting change, factors that coincide with the values promoted by the Chamber."

In an article recently published by *Fastmarkets*, Mr. Schalka emphasized that success goes beyond the boundaries of the business and shouldn't simply be measured in dollars and cents. "I have been very clear with financiers that they are being hypocritical in the ESG area because the first thing they ask me is about return on invested capital and dividends, while they should be asking how the company is building for the future."

Moving forward towards more autonomous operations



More and more companies aim to increase the autonomy of their mill or plant operations. In an autonomous mill or plant, an autonomous system can monitor its own performance, which brings several benefits, like improved safety and efficiency, lower costs and reduced environmental impact. Digitalization and more autonomous operations also mean that there is less need for human intervention. The role of people will continue to be important, evolving towards supervising and ensuring that different process areas perform well together, and towards managing exceptions. Operations and maintenance work will become more collaborative in the future as well.

Whether you are just beginning your digital transformation journey or you're further along in the process, Valmet's framework helps you recognize the necessary steps and building blocks. Our experts are there to support you as you move towards more autonomous and optimized operations.

More on valmet.com/autonomousoperations



NORTH AMERICA

Domtar's Kingsport Mill Resumes Operation; Produces First Containerboard Roll

Domtar in January announced that its Kingsport Mill in Tennessee produced its first roll of 100 percent recycled containerboard.

The milestone marks the culmination of a two-year, \$350 million investment project to convert the former uncoated freesheet paper mill into Domtar's first 100 percent recycled packaging facility. The repurposed paper machine has the capacity to produce about 600,000 tons per year of high-quality recycled linerboard and corrugated medium.

Employees celebrated by posing for photos with the first reel and even taking a few paper samples to remember the occasion.

"This is a monumental day for Domtar that marks our official entry into the containerboard market," said Steve Henry, Domtar executive vice president and chief operating officer. "I am proud of the packaging, mill and



extended Domtar team for their hard work and commitment. We are also grateful to our community for their support throughout the project."

The Kingsport Mill is the largest recycled manufacturer in Tennessee, home to the second-largest recycled containerboard

machine in North America. Each year the mill will convert about 660,000 tons of recovered fiber into high-quality recycled Performance Linerboard and Corrugated Medium.

Domtar will hold an official grand opening celebration at the Kingsport Mill in 2023.

Marcal Paper Acquires von Drehle Corporation

New Jersey-based tissue producer Marcal Paper has acquired von Drehle Corporation, a premier provider of quality towel and tissue products for the away-from-home market. Von Drehle Corporation will operate as a division of Marcal Paper.

Terms of the transaction, which closed in December of 2022, were not disclosed.

Von Drehle Corporation, founded in 1974, is headquartered in Hickory, North Carolina. The company's more than 500 associates operate production facilities throughout the

southeast United States and in Las Vegas, Nevada. The combined company provides customers with a broad product range and enhanced scale, expanding Marcal's footprint to service customers all along the East Coast and across the country.

Billerud Gains Funding Approval from Michigan Legislators in Support of Escanaba Mill Conversion

Billerud announced that the Michigan House of Representatives and Senate in January passed legislation approving an appropriation of up to USD 200 million in funding to support the company's plans to convert its paper mill in Escanaba, Michigan, to the production of paperboard.

On Jan. 31, Michigan Governor Gretchen Whitmer signed the legislation, approving the Michigan Economic Development Corporation's (MEDC) appropriation of the funds.

A pre-feasibility study about Billerud's planned conversion of the Escanaba mill from graphic papers to paperboard production is ongoing and planned to be completed during the first half of 2023, after which the company's Board of Directors can make an investment decision.

Currently, the Escanaba Mill has the capacity to produce approximately 730,000 tons per year of graphic papers, which are used in commercial printing, media and marketing applications, including magazines, catalogs,



books, direct mail, corporate collateral and specialty papers used in label and converting applications. The mill employs about 830 people.

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NORTH AMERICA

Georgia-Pacific Investing \$30 Million to Modernize Corrugated Plant in Owosso

Georgia-Pacific is making a significant investment at its corrugated plant in Owosso, Michigan. Newer equipment will improve the plant's throughput and print capability to better meet customer needs.

The upgrades include a new corrugator, converter, single facer, preheater, glue machine, and control systems as well as an upgrade to the existing single facer and unitizer.

According to Georgia Pacific, by enabling the double wall capability, Owosso will be able to expand its customer base and provide expanded products to current customers.

"The investment in the Owosso plant is part of our strategy to be the preferred partner of our customers and will help us continue to expand our product offerings with superior



service and quality," said Bill Smith, Georgia-Pacific's area general manager.

Mark Humrich, the Owosso plant's director of operations, added, "Our team has performed at high levels producing quality products for our customers with the older equipment. The

investment being made in our facility has everyone excited and is great for both our employees and the community as it helps set us up for long-term prosperity."

The legacy corrugator was taken offline at the end of 2022 after producing enough material to satisfy the plant's current customer needs until the new corrugator is ready to begin production.

Installation of the new equipment and testing took place in February, and the first production run to come off the line a few weeks later.

The Owosso plant employs approximately 130 people. It was started by Olin Kraft in 1964 and purchased by Georgia-Pacific in 1985. It serves customers in Michigan, Indiana, Ohio, Illinois, and Canada.

Cariboo Pulp & Paper to Take Downtime in Spring and Fall

West Fraser Timber announced the planned curtailment of operations at its Cariboo Pulp & Paper operation located in Quesnel, British Columbia, beginning in mid-April for a month and then for another month in the third quarter.

The Cariboo Pulp & Paper mill is a 50/50 joint venture between West Fraser and Mercer International. The mill has an annual production output of 336,000 tonnes of high-quality ECF NBSK pulp and a workforce of approximately 400 people.

In a press release, West Fraser said, "[The] decision is the result of the decline in availability of sawmill residuals. The fiber supply challenge in British Columbia is well documented. Infestation, fire, and government policy decisions have all impacted the amount of available fiber in the province.

"Downtime at Cariboo Pulp & Paper will help better align our production capacity this year with the available fiber supply. These plans may be adjusted should fiber forecasts change."



Cariboo Pulp & Paper expects to mitigate some of the impact on its affected employees through vacation scheduling and alternative work assignments.

Paper Excellence Completes Acquisition of Resolute

The Paper Excellence Group, through its wholly-owned subsidiary Domtar Corporation, on March 1 announced the successful closing of its previously announced acquisition of Resolute Forest Products Inc.

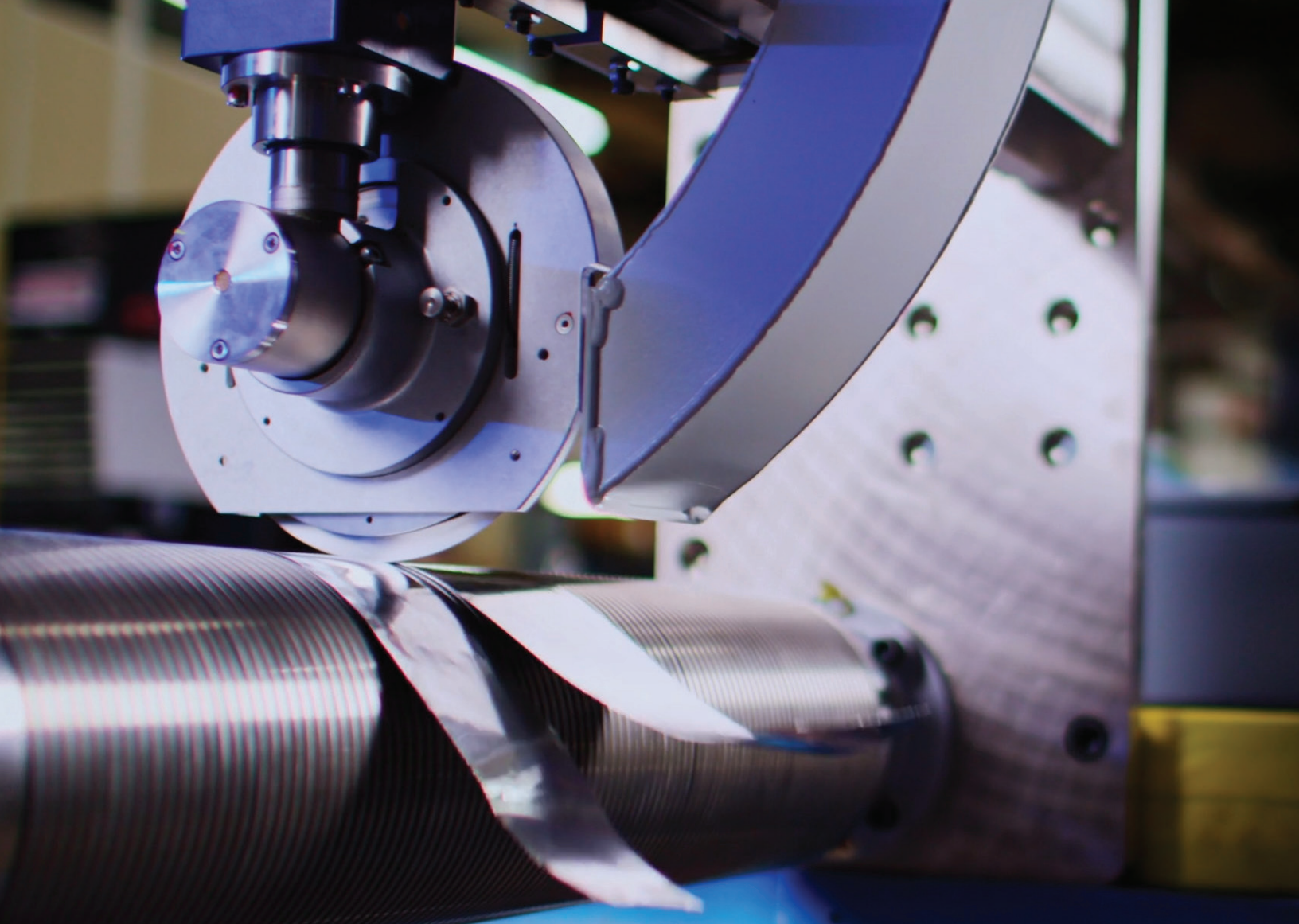
Paper Excellence first announced its intentions to acquire Resolute on July 6, 2022.

At that time Paper Excellence explained, "Resolute will become a wholly-owned subsidiary of Domtar, under the auspices of the Group, and continue to operate on a business-as-usual basis under the Resolute name.

"The Resolute management team will remain in place at the company's headquarters.

Considering the quality workforce available with Resolute and Domtar, Montreal will become an important hub for the Group's North American businesses.

"Furthermore, the Group plans to retain Resolute's production locations and levels of jobs."



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NORTH AMERICA

Kruger Packaging Announces \$30 Million Modernization Project at Place Turcot Mill

Kruger Packaging in February announced investments of over \$30 million to modernize its Place Turcot Containerboard Mill in Montreal, Canada.

According to Kruger, with this important transformation to be completed in 2025, the Place Turcot facility will be the first in North America to manufacture 100% recycled saturating kraft board, a product that is used to make high-pressure laminates for furniture, countertops and decorative paneling.

"With this transformation project, our aim is to secure the future of our Place Turcot Mill and to consolidate its position as a key player in the circular economy," said Maxime Cossette, Corporate Vice President, Fibre, Biomaterials and Sustainability at Kruger.

In support of the project, the government of Canada is contributing \$10 million through the Investments in Forest Industry Transformation (IFIT) program, while the Quebec government is providing a combined sum of more than \$3 million through the Innovation Bois Program, as well as the EcoPerformance program, which stems from the 2030 Plan for a Green Economy.

In addition to saturating kraft board, Place Turcot will make other specialty products from 100% recycled fibers, including gypsum board paper, customized board for residential construction, folding box board for FDA-compliant food packaging, and white top linerboard.

A key aspect of the Place Turcot Mill's transformation is the implementation of state-of-the-art machine learning and artificial intelligence technology. Together with upgrades to manufacturing equipment, these new capabilities will enable the plant to increase its productivity, reduce waste, and diversify its product lines to meet growing market demand for saturating kraft and other specialty paper grades, Kruger said.

The mill is also expected to reduce its GHG emissions by more than 2,200 tonnes per year once the modernization is completed.

Strategically located next to Kruger Recycling's Sorting and Recovery Centre, near downtown Montreal, Kruger Packaging's Place Turcot Mill has been making 100% recycled linerboard for over sixty years.

Domtar Announces CEO Transition Plan



Domtar recently announced that President and CEO **John Williams'** retirement date will be June 30, 2023. Williams has planned to leave the company after 14 years in his leadership role; however, he will continue as a part-time advisor regarding strategic growth opportunities.

To continue Domtar's forward momentum, **Steve Henry**, currently senior vice president of packaging, has been appointed to the role of executive vice president (EVP) and chief operating officer (COO) effective Nov. 30, 2022.

As EVP and COO, Henry will lead the pulp, paper and packaging operations and commercial functions at Domtar, while Williams continues to lead all corporate functions until his retirement. Henry will succeed Williams as CEO upon Williams' retirement.

John Williams' Legacy at Domtar

Williams has served as Domtar's president and CEO since 2009. During his tenure, he redefined the company as a fiber innovator, growing in markets like pulp, engineered materials, thermal paper and containerboard while exploring absorbent hygiene end uses and biomaterials.

He is well-respected in the industry, being named CEO of the Year by RISI in 2010, Executive Papermaker of the Year by PaperAge magazine in 2013 and PIMA Executive of the Year in 2019. He served on the Board of Directors of American Forest & Paper Association (AF&PA) and the Paper + Packaging Board as both member and chairperson. He also serves on the boards of Owens Corning and Form Technologies.

"On behalf of Domtar and the Management Committee, I want to thank John for his leadership and commitment to our employees, customers and communities over the past fourteen years," said Henry. "He joined the company during a recession and has navigated ever-changing industry dynamics and economic fluctuations to transform Domtar into the strong pulp, paper and packaging company that it is today. I am honored to build on his legacy and continue serving our stakeholders."

About Steve Henry

Steve Henry is an experienced and innovative leader who is well-respected at Domtar and in the industry for his in-depth knowledge of Domtar's manufacturing assets, his decisive nature and his people-oriented leadership style.

Throughout his 27-year career in the forest products and paper industry he held a variety of mill and corporate positions at Georgia-Pacific, Weyerhaeuser and International Paper before joining Domtar in 2011. Henry served as mill manager in multiple locations during his career and was named TAPPI/PIMA Mill Manager of the Year in 2016.

His most recent assignment has been to lead Domtar's entry into the packaging business, building the business structure needed to produce and sell containerboard with a winning customer value proposition.

John Williams said, "Steve has been a smart and dependable leader during his career at Domtar. I have relied on his expertise over the years, most recently as he engineered Domtar's entry into the packaging business. In 2023, we will celebrate our 175th year in business. I am confident that Steve is the right leader for this time in Domtar's history."

NORTH AMERICA

Domtar to Sell Dryden Pulp Mill to First Quality Enterprises

Domtar on Feb. 28 announced that it entered into an agreement with First Quality Enterprises whereby First Quality will acquire Domtar's Dryden pulp mill in Northwestern Ontario, Canada.

The purchase price was not disclosed.

The Dryden Mill has the capacity to produce 327,000 air-dried metric tons per year of Northern Bleached Softwood Kraft (NBSK) pulp.

First Quality has made clear to Domtar its commitment to the Dryden Mill, its employees and the surrounding community and that First Quality fully intends to continue business operations consistent with past practices.

"First Quality saw this as an excellent strategic investment given the knowledgeable leadership team, premium quality NBSK coming from the mill, and the access and availability to high quality fiber supplies



long term," said Jim Dodge, Chief Financial Officer of First Quality.

The sale of the Dryden Mill is a requirement under the consent agreement between Domtar and the Canadian Competition Bureau in connection with its review of Domtar's acquisition of Resolute Forest Products, which was completed on March 1.

The Dryden transaction, expected to close early in the third quarter, is subject to customary closing conditions, including

receipt of required regulatory approvals and the closing of the Resolute Forest Products transaction.

About First Quality. The First Quality family of companies is a closely held, diversified group of companies manufacturing, selling and distributing branded and private label absorbent hygiene, paper and packaging products. The company's headquarters is located in Great Neck, New York.

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SOUTH AMERICA

Arauco Mill Produces First Bale of Pulp on New Production Line in Chile

Arauco on January 20 produced the first bale of eucalyptus kraft pulp by the new production line (Line 3) at Arauco Mill in southern Chile. The construction of the new production line is part of Arauco's MAPA Project, which also includes major improvements to Line 2 and the closure of Line 1 — the last pulp bale of Line 1 was produced on January 3, 2022.

Arauco's US\$2.350 billion project



MAPA (Spanish acronym for Modernization and Extension of Arauco Mill project) at Arauco Mill Chile includes the termination of pulp line 1, the modernization of current production line 2 and the construction of a new production line (Line 3), with an annual capacity of 1,560,000 tons, increasing annual pulp production at the complex by an estimated 2.1 million tons.

EUROPE

Stora Enso to Invest EUR 30 Million in Renewable Energy Upgrades at Heinola Mill

Stora Enso will invest approximately EUR 30 million in its Heinola Fluting Mill to renew the power plant and modernize parts of the site. After the investment, the mill will be able to replace the remaining fossil-based fuels with renewable bioenergy, reducing the site's greenhouse gas emissions by more than 90%.

The Heinola Fluting Mill in southern Finland is an integrated pulp and board mill that produces high-quality semi-chemical fluting for the corrugated board industry. The mill has the capacity to produce 300,000 tonnes per year and employs about 190 people.

Stora Enso has set an ambitious environmental goal of halving greenhouse gas emissions from its operations by 2030. By replacing fossil energy sources with renewable energy sources, greenhouse emissions at the Heinola Fluting site will



be reduced by approximately 113,000 tonnes of carbon dioxide (CO₂).

Construction work will begin at the end of 2023 and the investment will be completed in the last quarter of 2024. It will have no personnel impact at the site.

Currently, the energy produced at Stora Enso's Heinola Fluting site provides 95% of the district heating needed by the residents of the city of Heinola. When the investment is completed the source of heating will be almost entirely based on renewable bioenergy.

EUROPE

Dutch Paper Producer Crown Van Gelder Files for Bankruptcy

The District Court of Noord-Holland has declared specialty paper producer Crown Van Gelder B.V. bankrupt. Despite excellent financial performance in 2021 and 2022, the company realized it would no longer be able to meet payment obligations in 2023 and was forced to file for bankruptcy.

According to the Dutch paper producer, the company's financial problems are the result of a combination of factors, especially continually rising energy and raw materials costs.

"Despite the positive operating result for financial year 2022 and persistent efforts to do so, Crown Van Gelder has not been able to resolve a liquidity shortfall caused mainly by increased costs (especially energy and raw materials) and a sudden drop in orders resulting in unusually long standstill of production," the company said in a press release. "Secondly, the company is uncertain about market developments in the near future."

Miklas Dronkers, CEO at Crown Van Gelder, commented, "In 1896, the first paper rolled off the machine in Velsen. Innovation has always been at the heart of our paper mill. I am very proud of our employees who are always looking for innovation and opportunities. It hurts that our beautiful independent paper mill has been confronted with this situation."

Crown Van Gelder operates a paper mill in Velsen-Noord in the Dutch province of North Holland, the Netherlands. The mill has two paper machines and produces specialty papers for food packaging and luxury shopping bags, along with various grades of inkjet paper. The company has about 250 employees. Over 90% of the mill's paper is sold to customers outside of the Netherlands.

The managing board and bankruptcy trustees, Mr. R. Mulder LLM (Pot Jonker Advocaten) and Mr. A.H.J. Dunselman LLM (Schenkeveld Advocaten), are in deliberation with several interested parties with respect to the possible continuation of the activities in the future.

EUROPE

Sylvamo Acquires Stora Enso's Nymölla Pulp and Paper Mill

Sylvamo in January completed the acquisition of Stora Enso's uncoated freesheet paper mill in Nymölla, Sweden, for EUR 150 million. In the last 12 months ending June 30, 2022, the facility generated 350 million euros in revenue.

The Nymölla mill is an integrated site with two pulp lines and the capacity to produce approximately 500,000 short tons of uncoated

freesheet on two paper machines. The mill produces several brands, including Multicopy, and paper used for office printing, business forms, digital printing, offset for printing books and much more.

"The Nymölla mill strengthens our uncoated freesheet product mix and enables us to serve customers across Europe and around the world

more effectively," said Jean-Michel Ribiéras, chairman and CEO of Sylvamo.

The Nymölla mill has an excellent environmental footprint, which complements Sylvamo's purpose to produce paper in the most responsible and sustainable ways. The low-cost mill generates 85% of its energy needs from carbon-neutral, renewable biomass residuals.

MM Board & Paper to Make Major Investments at Three Mills

Mayr-Melnhof (MM) Board & Paper will rebuild board machines at its mills in Frohnleiten (Austria), Neuss (Germany) and Kolicveo (Slovenia), implementing technologically advanced industrial processes and production improvements.


MM Frohnleiten Mill has two board machines — BM2 and BM3 — with a combined capacity to produce 520,000 tpy of recycled cartonboard. The modernization of Board Machine 3 includes the latest

production technologies in cartonboard manufacturing that will increase product quality and capacities. The is taking place from February to mid-March 2023.

MM Neuss Mill has one board machine, BM5, with the capacity to produce 350,000 tpy of liner and recycled cartonboard. The rebuild will transform BM 5 into a state-of-the-art linerboard machine. In addition, a new winder will be installed to follow increasing production volume. The project is scheduled

from mid-March to beginning of May 2023

MM Kolicveo Mill has one board machine, BM3, with the capacity to produce 225,000 tpy of recycled cartonboard, virgin fiber cartonboard and liner. BM3, which can be operated in "swing mode" to produce various board grades, will be modernized to increase product quality and expand its production capacity. Additional investments include a new rewinder. This modernization project is scheduled in August and September 2023.



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EUROPE**WEPA Group Starts-Up New Tissue Machine in Bridgend, Wales, UK**

The WEPA Group recently put a new tissue machine into operation at its site in Bridgend, Wales, in the UK, doubling its production capacity of tissue for the UK market. The parent rolls of tissue produced in Bridgend are converted into tissue paper products for the British consumer market.

The new machine, a Valmet Advantage DCT with a width of 5.6 meters and a design speed of 2,200 m/min, has an annual production capacity of 70,000 tons. The new production line is optimized to save energy and enhance the quality of the final product,

and designed to use recycled and virgin fiber.

“With the largest single investment in the history of the WEPA Group, we are reaffirming our claim to technology and market leadership in sustainable hygiene paper,” said Martin Kregel, CEO of the WEPA Group.

Kregel pointed out that Great Britain is an important growth market for WEPA.

“It is important for us to promote market orientation and to produce for our British customers in our own country,” said Martin Kregel, CEO of the WEPA Group. “Investing in Bridgend is an investment in the future and



in long-term customer partnerships.”

With a total of 22 paper machines, the Wepa Group has a production capacity of around 850,000 tons per year.

Norske Skog Nearing Start-up of Converted PM3 at Bruck Mill in Austria

Norske Skog said that its Bruck mill in Austria is getting close to starting-up paper machine 3 (PM3), which is being converted from the production of newsprint to recycled containerboard. The machine conversion is an EUR 90-100 million investment.

PM3, which had the capacity to produce 125,000 tonnes per year of newsprint, produced its last reel of “NOR News” on July 10, 2022.

Upon the completion of the conversion project, PM3 will have the capacity to produce 210,000 tonnes per year of recycled containerboard.

In a statement on Norske Skog’s website, the company said, “We are looking forward to the start of the paper machine in March, marking the end of the conversion project in Bruck. The various installations in the newly

built OCC plant continue to be tested, checked, and taken over by the operating crews in cooperation with the companies involved in the project to prepare for the first production.”

The Bruck mill also operates PM4, which has the capacity to produce 265,000 tonnes per year of light-weight coated (LWC) paper.

RUSSIA**International Paper Reaches Agreement to Sell Ownership Interest in Ilim JV**

International Paper in January announced that it entered into an agreement to sell its 50% interest in Ilim SA, the holding company for its Ilim joint venture (JV), to its JV partners for US\$484 million equity value.

The sale is subject to regulatory approvals in Russia.

This transaction indicates ~\$3.5 billion in total enterprise value (TEV) for Ilim based on a ~3.1X EBITDA multiple on 2022 full-year results.

International Paper also received an indication of interest from its JV partners to purchase all of its shares (constituting a 2.39% stake) in JSC Ilim Group for US\$24 million

on terms and conditions to be agreed.

International Paper intends to pursue an agreement to sell the JSC Ilim Group shares, and to divest other non-material residual interests associated with Ilim, to its JV partners.

Ilim Group operates major Russian pulp and paper mills in the Arkhangelsk, and Irkutsk Regions, having branches in Koryazhma, Bratsk and Ust-Ilimsk, as well as forestry branches, procuring raw materials to the production facilities, and two corrugated cardboard plants in the Leningrad and Moscow Regions.

According to the most current information on Ilim’s website, the company produces



2.16 million tons per year (tpy) of pulp; 815,000 tpy of board (kraftliner); 532,000 tpy of paper (uncoated and coated grades); and 131,000 tpy of corrugated packaging. Ilim’s central office is in Saint Petersburg.

INDUSTRY SUPPLIERS

Valmet to Supply Sappi with Paper Machine Conversion Rebuild at Somerset Mill

Valmet will supply an extensive rebuild for Paper Machine No. 2 (PM 2) at Sappi North America's Somerset Mill in Skowhegan, Maine. Previously, Valmet rebuilt the mill's Paper Machine No. 1 (PM 1).

PM 2's production will be converted from 240,000 tons per year of coated freesheet to 470,000 tpy of solid bleached sulphate (SBS) board.

"Valmet has proven to be a trusted supplier to Sappi over the years and we're pleased to work with them again on our PM2 project," said Michael Haws, President and CEO of Sappi North America. "This investment is fully aligned with our Thrive25 strategic focus to reduce our exposure to graphic paper and transition our portfolio to packaging and specialty papers, pulp and biomaterials."

Jukka Tiitinen, Area President, North America for Valmet, said, "We look forward to continued

collaboration with Sappi North America, and we thank them for their partnership on another conversion project. We know the demand for packaging and specialty papers in North America is high and we're confident that through our combined efforts, we'll meet future market needs."

PM2 will be rebuilt using some of the most advanced packaging manufacturing technology to produce a variety of both packaging and coated paper products.

Start-up of the rebuilt paper machine is scheduled for mid-2025.

The Somerset Mill has three paper machines (PM 1, PM 2, and PM 3) and the capacity to produce 970,000 metric tons per year of coated woodfree paper and 525,000 metric tons of bleached chemical pulp for its own consumption and as market pulp.

Voith to Convert Idled Paper Machine at Stora Enso's Oulu Mill to Packaging Grades

Voith will convert an idled paper machine at Stora Enso's Oulu Mill in northern Finland to the production of consumer board. The machine, paper machine 6, which previously produced coated graphic papers, will have the capacity to produce 750,000 tons per year of folding boxboard (FBB) and coated kraft back (CKB).

Start-up is scheduled for early 2025.

Stora Enso's conversion plans for paper machine 6 follows the successful conversion of the Oulu mill's other machine (formerly paper machine 7, now BM 7) from paper to kraftliner. BM 7 started up in January 2021.

Stora Enso announced in October 2022 its decision to move ahead with the conversion of paper machine 6 to board production, stating, "The investment supports the Group's growth strategy in renewable packaging by providing new volume for growing packaging segments. The target end-use segments are food and beverage packaging, especially frozen and chilled, and dry and fast food, mainly in Europe and North America."

Currently, the Oulu Mill in northern Finland has the capacity to produce 450,000 tonnes per year of kraftliner and 530,000 tonnes per year of unbleached softwood pulp.

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PAPER

■ *Ahlstrom* has appointed **Helen Mets** as President and CEO, effective January 1. Mets succeeds **Hans Sohlström**, who left the company at the end of December to pursue new opportunities. Mets is an international business leader with over 30 years of experience. She has held a range of senior executive leadership roles at Avery Dennison, Pon, and at Royal DSM. Since December 2021, she has also served on the Ahlstrom Board of Directors.



Helen Mets

■ *Appvion*, a Wynnchurch Capital portfolio company, in December 2022 named **Paul Charapata** as Chief Executive Officer. Charapata previously served as President and CEO of Nekoosa Coated Products, which was acquired by Wynnchurch in Nov. 2022. Charapata replaces **Laurie Andriate**, who transitioned to Appvion's Board of Directors.



Paul Charapata

■ *Crown Paper Group* recently announced that **Will Lindsay** has been named Chief Executive Officer, effective December 19, 2022. Lindsay has over three decades of industry, and most recently served as Senior Director, Global Papers Strategy and Product Optimization at WestRock.



Will Lindsay

■ *Monadnock Paper Mills* announced that **Brigitte O'Connor** has joined the company as Southeast Regional Sales Manager. O'Connor has more than 25 years of experience in the

industry with a strong background in graphic communications, paper, packaging and printing. Most recently, she was a senior account executive for Standard Press in Atlanta.



Brigitte O'Connor

■ *Stora Enso* has appointed **Minna Björkman** as Head of Sourcing and Logistics and a member of the Group Leadership Team. Björkman joined Stora Enso in 2019 as Senior Vice President, Supply Chain and Operational Excellence for Packaging Solutions. Prior to Stora Enso, she held several senior level positions at Finnish companies such as Nokia, Fazer and Kemira.



Minna Björkman

■ *UPM* has appointed **Christian Librera** as Senior Vice President Biofuels to lead the company's Biofuels business platform. Librera joins UPM from Clariant, where he had been leading the Biofuels & Derivatives business since 2020. He holds a PhD in Organic Chemistry.



Christian Librera

■ *Veritiv* announced that **Steve Smith**, Senior Vice President and CFO, will retire in September 2023 and that **Eric J. Guerin** will succeed him, effective March 1, 2023. Guerin, who has spent more than 20 years in finance leadership roles, most recently served as Executive Vice President and CFO of CDK Global.



Eric Guerin

■ *Willamette Falls Paper Company* announced that **Mary Beth McCabe** has joined the company as Director of Business Development. McCabe brings considerable industry experience to Willamette Falls Paper Company. Previously, she was the Specialty Account Director for ND Paper, Catalyst Paper and NewPage Corporation.



Mary Beth McCabe

RECOGNITION

■ **Martin Hubbe, Ph.D.**, a professor and Buckman Distinguished Scientist at North Carolina State University, has been named winner of TAPPI's Gunnar Nicholson Gold Medal Award. Dr. Hubbe, a TAPPI Fellow, has edited three books for TAPPI Press and served as chair of TAPPI's Introduction to Wet-End Chemistry course for several years. A TAPPI member since 1978, Hubbe was an active member of the Virginia-Carolina and Delaware Valley TAPPI Local Sections. He served as conference track manager for several TAPPI conferences and as Chair for TAPPI's Cost Saving Strategies course.



Martin Hubbe

About the Gunnar Nicholson Gold Medal Award

The prestigious Gunnar Nicholson Gold Medal Award is TAPPI's highest technical honor in recognition of an individual's exceptional industry contributions.

SPECIAL REPORT

Graphic Packaging Announces Plans to Build CRB Mill in Waco, Texas

Graphic Packaging's President and CEO, Mike Doss, in early-February announced plans to build a greenfield CRB (coated recycled board) pulp and paper mill in Waco, Texas. In addition to the paper mill, the pulp mill will feature advanced pulping technology that will include the capability of repulping paper cups.

According to Graphic Packaging, an investment of approximately \$1 billion over three years will be internally funded with operating cash flow.

"We will be leveraging our unique expertise in CRB production from the recent K2 investment and our leading North American mill system to build a new CRB mill in Waco, Texas," Doss said during Graphic Packaging's Q4 and full-year 2022 earnings call.

Editor's note: K2 refers to Graphic Packaging's new CRB machine in Kalamazoo, Michigan, which successfully started-up in the fourth quarter of 2022.

"Our decision to build this mill shortly after K2 allows us to leverage key learnings from that process, both internally with our external partners, which gives us added confidence in our ability to

meet the projected timeline and quickly ramp-up production on the new recycled paperboard machine," Doss explained.

"From a timing perspective, we expect to start construction this quarter and begin commissioning the machine by the end of 2025 with production ramping up in early 2026," he noted.

Doss pointed out that Waco is a prime location for the mill due to its location within the Texas Triangle.

"The city of Waco is situated in the Texas Triangle. Our new mill will be strategically located within 200 miles of approximately 80% of the population in Texas, providing easy access to a strong existing recycled fiber basket. Waco also has existing infrastructure to support a mill as well as advantaged logistics from a rail and roadway perspective to supply our packaging facilities and our customers," he said.

The new CRB mill will also feature advanced pulping technology that will allow it to process paperboard waste and recovered paper cup stock.

"We will be increasing circularity of our system through an enhanced drum pulper

investment. This investment increases our ability to clean and separate a broader range of secondary fibers. Today, a large percentage of our paperboard waste that we cannot recycle is exported," Doss said.

"Our Waco mill is designed to enable the recycling a 100% of our own internally generated paperboard side rolls and waste. We plan to capture the value of that fiber as well as reduce the environmental impact of shipping the fiber offshore for processing. We are estimating around 200,000 tons of side rolls and waste will be processed at the Waco mill versus purchasing external secondary fiber as we do today," he explained.

"This machine also increases our paper cup recycling ability. The drum pulper has the capacity to process up to 15 million paper cups per day. To take advantage of this increased recycling capacity, we have launched teams to engage with our customers and recycling partners to increase the collection rate of paper cups to further support recovery and a more circular economy," Doss said.

calendar

APRIL 19-21, 2023

PPC Spring Outlook & Strategies Conference

Paperboard Packaging Council
Sheraton Grand Nashville Downtown
Nashville, Tennessee, USA
paperbox.org/events

APRIL 22-26, 2023

TAPPICon

TAPPI
Cobb Galleria
Atlanta, Georgia, USA
tappicon.org

APRIL 24-26, 2023

AICC 2023 Spring Meeting

The Independent Packaging Association
Trump National Doral Resort
Miami, Florida, USA
www.aiccbbox.org

MAY 24-25, 2023

Paper & Biorefinery Conference

Austropaper and APV
Messecongress Graz
Graz, Austria
paper-biorefinery.com

JUNE 4-6, 2023

International Pulp Week

Pulp and Paper Products Council
Fairmont Hotel Vancouver
Vancouver, British Columbia, Canada
internationalpulpweek.com

JUNE 7-10, 2023

PACWEST Conference 2023

PACKWEST
Fairmont Chateau Whistler
Whistler, British Columbia, Canada
www.pacwestconference.ca

JUNE 12-16, 2023

Nanotechnology for Renewable Materials

TAPPI
Westin Bayshore
Vancouver, British Columbia, Canada
conference.tappinano.org

JUNE 18-22, 2023

ICCA/WCO Global Summit

International Corrugated Case Association
World Containerboard Organization
Fairmont Banff Springs
Banff, Alberta, Canada
www.iccanet.org/global-summit

OCTOBER 24-26, 2023

Specialty Papers US

Smithers
Hyatt Regency Milwaukee
Milwaukee, Wisconsin, USA
www.specialtypaperconference.com/specialty-papers-us



AF&PA: 2023 Advocacy Priorities to Engage, Inform and Influence

By Heidi Brock, President and CEO, American Forest & Paper Association

The American Forest & Paper Association and our members play a critical role as sustainability leaders, especially as we seek to engage, inform and influence policymakers on key issues.

Whether you are a current member, or considering joining AF&PA this year, your partnership will be key to our advocacy success as we work together to address top policy and regulatory issues.

Earlier this year, AF&PA's Board of Directors, led by our Board Chair Brian McPheely, Global CEO of Pratt Industries, Inc., announced advocacy priorities the Association will pursue in 2023.

As industry leaders, our members have been laser focused on positioning the paper and wood products industry as the leading manufacturer of safe, sustainable and essential materials for the circular economy.

I encourage you to join us as we achieve priority public policy outcomes for our industry this year:

Sustainability

We continue to be at the forefront of sustainability efforts in manufacturing, proactively setting, meeting, and even surpassing rigorous sustainability goals as part of our *Better Practices, Better Planet* initiative.

Our *Better Practices, Better Planet* 2030 goals advance our sustainability



The U.S. paper and wood products producer's use of renewable, carbon-beneficial bioenergy to power paper mills reduces greenhouse gas emissions, preventing about 181 million metric tons of CO2 emissions from entering the atmosphere each year. That's roughly equal to removing 35 million cars from the road. Photo courtesy Domtar.

leadership. AF&PA members raised the bar with five updated goals for 2030, including further reducing greenhouse gas (GHG) emissions, increasing production of renewable and recyclable products, striving toward zero workplace injuries, and advancing sustainable water management and resilient U.S. forests.

Energy and The Environment

To meet sustainability targets set by the Biden administration, it is essential the government and private sector collaborate.

For decades, U.S. paper and wood products manufacturers have led the way in helping our country achieve our environmental goals.

For instance, our use of renewable, carbon-beneficial bioenergy to power paper mills reduces greenhouse gas emissions, preventing about 181 million metric tons of CO2 emissions from entering the atmosphere each year. That's roughly equal to removing 35 million cars from the road.

With a track record of success in

reducing GHG emissions by 24.1% since 2005, our industry is bringing solutions to the table as we seek to work toward a more sustainable future, including innovations in recycling, by landfill diversion, which also helps contribute to GHG emission reductions. U.S. paper and wood products manufacturers are proven partners whose sustainability successes can inform collaborative efforts, leading to achievable solutions for addressing our environmental challenges while promoting economic growth and job creation.

Paper Recycling and Product Stewardship

Paper is one of the most widely recycled materials in America and an environmental success story with a positive impact on the broader circular economy.

Every year since 2009, the paper recycling rate has met or exceeded 63%, and the cardboard recycling rate has met or exceeded 82%. We can look to the paper industry as a model for success. Our industry successfully expanded access to recycling programs, increased recycling rates and created thriving end markets for recycled materials.

AF&PA members believe in producer responsibility and have taken a leadership role in voluntarily advancing the recycling system. We support policies that aim to improve recycling and composting in the U.S. and improve recycling access, especially in underserved communities, connecting more Americans to our recycling infrastructure.

Our industry has also announced \$5 billion in mill manufacturing investments by the end of 2024 to enhance our capacity to use recycled fibers in paper products by nearly 25%. These investments — nearly \$2.5 million worth of investment per day — will further advance innovative paper products.

Business Impact and Marketplace Sustainability

The U.S. forest products industry is one of the largest manufacturing industries in America. We create business impact in communities, big and small, and sustain high-paying and highly skilled jobs. Our industry is often the heart of many local communities across the country. To stay competitive globally, we need policies that support U.S. manufacturing, our workforce, and supply chains.

We value strong relationships with workers in our mills and broader labor coalitions throughout our industry, including with the United Steelworkers (USW) and other labor unions, as we work to achieve our shared policy goals.

Our industry successfully expanded access to recycling programs, increased recycling rates and created thriving end markets for recycled materials.

AF&PA also supports policies that promote efficiency and safety within rail, maritime and highway freight transportation, along with thoughtful policies related to tax and international trade to allow our industry to compete in the global marketplace.

Additionally, we support sustainable forest management and fiber procurement best practices. Trees are one of our most abundant renewable resources, and a healthy forest products industry goes hand-in-hand with healthy forests.

Safety

AF&PA members are committed to the safety of our industry's essential workforce and end-users. Over the last decade,

AF&PA members have made continuous progress in improving worker safety, surpassing our *Better Practices, Better Planet 2020* goal.

Safety excellence is a top priority for AF&PA and our member companies. "Goal Zero" is more than a target — it's a mindset. In 2020, member company recordable incidence rate was 30% lower than the 2006 baseline.

Our 2030 goal strives for zero injuries and emphasizes continual focus and progress on preventing Serious Injuries and Fatalities (SIFs) and supporting members' implementation of ongoing SIF programs at paper mills.

AF&PA is ready for the challenges and opportunities that lie ahead, and we look forward to working with you to advance a more circular economy. To stay engaged and learn more about AF&PA's 2023 policy priorities, visit: www.afandpa.org/news

About AF&PA

The American Forest & Paper Association (AF&PA) serves to advance U.S. paper and wood products manufacturers through fact-based public policy and marketplace advocacy. The forest products industry is circular by nature.

AF&PA member companies make essential products from renewable and recycle resources, generate renewable bioenergy and are committed to continuous improvement through the industry's sustainability initiative — *Better Practices, Better Planet 2030: Sustainable Products for a Sustainable Future*. The forest products industry accounts for approximately 5% of the total U.S. manufacturing GDP, manufactures about \$350 billion in products annually and employs about 925,000 people. The industry meets a payroll of about \$65 billion annually and is among the top 10 manufacturing sector employers in 43 states. ■

Building for a Sustainable Future

Through innovation and diversification of its product mix, Suzano continues to explore the opportunities from producing sustainable products with eucalyptus-based wood.

By John O'Brien, Managing Editor



Walter Schalka

Since joining Suzano as Chief Executive Officer in January 2013, Walter Schalka has been instrumental in inspiring the company to become a global leader in the pulp and paper industry.

Indeed, São Paulo-based Suzano has invested in product differentiation, innovation, and the development of sustainable technologies. In addition, the company has dramatically increased ownership of forest assets close to its existing mills in Brazil, while ensuring the highest stewardship for land management and biological conservation.

Today, Suzano produces pulp, paper, tissue, and lignin-based products — all from planted eucalyptus trees — and continues research and development on several new bio-based products.

Beyond the production and development of products, Mr. Schalka emphasizes the importance of implementing Environmental, Social, and Governance (ESG) standards as an essential part of building the company for the future.

Recently, the Brazilian-American Chamber of Commerce announced

Mr. Schalka as the Brazilian recipient of the 2023 Person of the Year Award.

In a statement, the Chamber said, “The choice of Mr. Schalka recognizes the prominent and influential role he has played in growing Suzano into the world’s largest hardwood pulp producer and a leader in the Latin American market. His commitment to ESG — particularly in the areas of climate change, biodiversity, and social development — is admirable and has brought about measurable and lasting change, factors that coincide with the values promoted by the Chamber.”

In his response to the honor, Mr. Schalka redirected the Chamber’s praise to the people he works with. “I am nominated as Person of the Year by the Brazilian-American Chamber of Commerce in recognition of the work of all Suzano employees, who lead the company in this process of constant transformation. One of Suzano’s directors says that it’s only good for us if it’s good for the world, and it’s these people who, on a daily basis, put this cultural pillar into practice,” he said.



In light of Suzano's continuing transformation and successful strides toward sustainability, PaperAge has selected Walter Schalka as our 36th Executive Papermaker of the Year.

Suzano / Fibria

The most transformative event during Schalka's tenure took place in January 2019 when Suzano Pulp & Paper completed the merger with Fibria. Upon the close of the US\$7.3 billion deal, the merged companies began operating as Suzano S.A.

"We have successfully realized a dream," Schalka said. "The journey on which we now embark is driven by the aspiration to play a leading role in the advancement of society, to be a reference in the sustainable use of renewable resources and, consequently, to help build a better world, today and tomorrow."

"We are excited about the transformations that Suzano is undergoing and take this opportunity to reinforce our commitment to continue contributing to the development of Brazil and to promoting education, culture, health, and the well-being of people," Schalka said.

Expansion of Forest Assets

Moving ahead to June of 2022, Suzano completed the purchase of over 206,000 hectares of eucalyptus forests in Brazil owned by eight separate companies for the total price of US\$667 million. Suzano explained that it already used the forest assets through forestry partnership contracts signed in 2012 by its predecessor, Fibria. The eucalyptus forests — in the states of Bahia, Espírito Santo, Mato Grosso do Sul, and São Paulo — are strategically located near Suzano's existing mills.

"Suzano currently has a very competitive cost of debt and cash availability to acquire these assets and thus ensure greater operational efficiency and less dependence on third-party wood in the long term," Schalka said about the purchase.

The company noted that prioritizing a secure local supply of wood is aligned with Suzano's 'best-in-class' philosophy to reduce the total cost of pulp production, while ensuring the highest stewardship for land management and biological conservation, along with the associated

carbon footprint, helping contribute to the company's science-based target on climate change.

Growing in Tissue

Suzano's tissue business has expanded significantly since entering the market only five years ago.

At the end of June 2022, Suzano announced plans to build a tissue mill with converting operations in the municipality of Aracruz, in the state of Espírito Santo, Brazil. The new plant will have the capacity to produce 60,000 tons per year of tissue, which would then be converted into tissue and towel products.

Suzano estimated the investment in the project would be about R\$600 million and an implementation period of approximately two years from the time of its approval.

Suzano said the construction of the new tissue mill is in line with its strategy to advance in the links of the value chain, always with a competitive advantage, such as in the country's growing market for sanitary paper products.



Dispatch at Suzano's Limeira unit (state of São Paulo). Suzano has the capacity to produce over 10 million tons of pulp per year. Photo: Fernando Cavalcanti.

Some three months later, in late-October, Suzano announced a deal to acquire Kimberly-Clark's (K-C) tissue business in Brazil for \$175 million. The purchase includes K-C's tissue mill located in Mogi das Cruzes, São Paulo, which has an installed capacity of 130,000 tons per year and produces the "Neve" brand. The deal includes licensing of global brands for Brazilian markets in the At-Home and Away-From-Home sectors.

The acquisition increases Suzano's share in Brazil's tissue market from 11% to about 22% and positions the company as the market leader in the North and Northeast of Brazil.

Cerrado Project Update

An initiative that will have a considerable impact in the future is Suzano's so-called "Cerrado Project."

Initially announced in May of 2021, Suzano is building a new pulp mill with an annual production capacity of 2.55 million tons. The R\$19.3 billion project is one of the largest private-sector investments currently under development in Brazil.

The eucalyptus pulp mill is being built in the municipality of Ribas do Rio Pardo, in Mato Grosso do Sul, Brazil. The project is nearly 50% complete and is on-time and on-budget.

When operating at full capacity, the new mill will increase Suzano's current pulp production capacity of 10.9 million tons by approximately 20%. Suzano expects start-up in the second half of 2024.

"The new plant represents an important milestone in our long-term strategy," Schalka said. "Through our products, Suzano already reaches the lives of over two billion people globally and we are committed to meeting the world's growing demand for sustainable consumer products developed from renewable materials."

The new mill will have the capacity to sell approximately 180 MW of surplus

Suzano at a glance

- Nearly 40,000 employees
- Nearly 1.5 million hectares of planted trees
- More than 1 million hectares of preserved forests
- Production of more than 10 million tons of pulp per year
- Production capacity of 1.2 million tons of paper per year
- Production capacity of 140,000 tons of tissue per year

energy to Brazil's power grid and it will have as one of its differentials the gasification of biomass to replace fossil fuel in lime kiln, representing a new milestone in eco-efficiency and sustainability for the industry and region.

According to Suzano, once completed, the project will be the world's largest plant with a single eucalyptus pulp production line. It will create up to 10,000 direct jobs during construction and 3,000 new employment opportunities once operational.

"This project will also make an important contribution to income generation and job creation in Brazil, while increasing our carbon capture capacity through the expansion of our forest base," Schalka added.

The Cerrado Project represents an important development in the company's long-term strategy, contributing to the expansion of its structural competitiveness, meeting the growing demand for hardwood pulp, and for the company's evolution in sustainability.

The Launch of Suzano Ventures

In June of 2022, Suzano announced the launch of Suzano Ventures, a global corporate venture capital initiative intended to stimulate the development of new solutions in areas including climate technology, bio-based products,

agroforestry, and sustainable packaging.

In a statement, the company said, "Suzano Ventures' will invest US\$70 million in a range of businesses with the potential to revolutionize their sector and beyond, by addressing some of the world's most pressing environmental challenges. Initially, the initiative will focus on companies operating within at least one of four bioeconomy applications:

- Improving the measurement and management of carbon sequestration
- Accelerating and maximizing agroforestry yield
- Developing new technologies and applications for pulp biomass
- Creating more efficient pulp packaging from renewable sources

All investments will be aligned with Suzano's philosophy of "innovability" — the pursuit of sustainable solutions through innovation.

Spinnova JV

Suzano has invested in a number of startups in recent years as part of its efforts to identify new everyday sustainable uses for eucalyptus biomass. Among its most recent successes is Spinnova, a Finnish company that has developed the technology to produce the first highly sustainable textile fiber made from wood-based pulp fiber.

Suzano's initial investment in Spinnova of EUR 5 million was made in 2017, followed by other investment rounds. Currently, the JV called Woodspin has completed construction of a production plant located on the south side of Jyväskylä in Central Finland. Woodspin will rely on Spinnova as the exclusive technology provider, while Suzano ensures the supply of certified, high-quality micro-fibrillated cellulose(MFC).

Suzano is following the final stage of factory construction and the first tests of unit activity that will gradually ramp-up production of fiber for global textile

brands, several of which have already signed agreements with the company to support the development of their materials.

Limeira Mill to Produce MFC

In addition to advancing the production of textile fiber with Spinnova, Suzano plans to produce MFC at its Limeira unit in São Paulo for internal and external application (to the market). The company noted that the “super-refined cellulose can be used in several different applications, with good prospects for scaling in the coming years.”

Biomass

At the Climate Conference, COP27, in Egypt, Suzano, along with Itaú Unibanco, Marfrig, Rabobank, Santander, and Vale announced the creation of a company fully dedicated to the restoration, conservation, and preservation of forests

in Brazil. The objective of the initiative over 20 years is to reach a total restored and protected area of 4 million hectares of native forests in different Brazilian biomes, such as the Amazon, Atlantic Forest, and Cerrado.

Initially called Biomass, the company was born with plans to restore 2 million hectares of degraded areas, from the planting of approximately 2 billion native trees, in a large-scale business model. The company will also conserve and preserve 2 million hectares.

The expectation of the group, which is formed by large companies with a global presence, is to contribute to stimulating regional development and strengthening local communities with their involvement in the value chain.

Innovability Hub in China

In a commitment to one of its primary

export destinations, Suzano launched in March 2023 its “Innovability Hub” at the Zhangjiang Science City in Shanghai, China — Suzano’s first R&D and innovation center in Asia.

With an investment of over US\$10 million, the Innovability Hub will mainly consist of an advanced laboratory and an interactive experience center.

“Chinese demand for hardwood pulp is expected to increase exponentially in the coming years,” Schalka said. “Suzano is well placed to deliver on the organic growth opportunity with our extensive commercial ties in China.

“As a company, we are hugely committed to ongoing R&D in sustainable innovation, and our Innovability Hub is the next step for us as we prioritize nature-based solutions which align with China’s 2060 Carbon Neutrality target,” he added. ■



Congratulations to
Suzano's CEO

Walter Schalka

on being PaperAge's 2023
Papermaker of the Year.

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The Future of Fiber Measurement

Advancements in fiber analysis techniques — the future of improving pulp quality.

By William Dannelly, Product Line Manager – QCS, ABB



William Dannelly

To remain both competitive and profitable, mills must harness their supply chains to optimize their products, processes, organizational set-ups and business models. For many paper producers, these big themes can be addressed by looking more closely at some of the smallest components — the fibers their products are made of.

But, with generally low margins and limited capital budgets, the priority for spending in paper mills is typically on required maintenance, followed by projects that remove bottlenecks to increase productivity and ensure a good return. For innovative projects to attract investment, it is necessary to find opportunities that offer low risk and high potential returns.

It has long been time for the pulp and paper sector to get beyond its traditional mindset by recognizing the huge potential that small, but significant, optimization projects can make. One such example is the adoption of advanced fiber measurements, which, when combined with artificial intelligence (AI) techniques, can provide far greater control of end-product quality, generating high value with minimal, if any, risk. It is often the low-hanging fruit — the everyday tools such as fiber measurement — we take for granted that can yield the greatest returns.

Employing new advancements in fiber measurements can benefit operations — from new product development to better quality products — and help in the drive for better efficiency and higher profitability.

Emergence of Micro-Cellulose and Nano-Cellulose Products to Drive Sustainability

A recent trend in cellulosic pulps is the development and use of micro-cellulose and nano-cellulose formats to produce new, improved and more sustainable paper products. These include micro-fibrillated cellulose (MFC), cellulose nanofiber (CNF), and cellulose fibrils (CF).

All of these nanofiber products are very small with a high specific surface area, and are often used as strengthening agents because they increase the amount of hydrogen bonding in a sheet to improve its tensile strength. Because the nanofibers are cellulose-based, they can be used to replace other bonding agents such as polymers derived from petroleum products, and thus offer a more sustainable alternative.

One challenge with nanofibers, however, is that conventional fiber analyzers are not designed for detecting and characterizing such small fibers, although an analytical method that can detect and characterize small particles in a pulp suspension was developed and patented



Employing new advancements in fiber measurements can benefit operations — from new product development to better quality products — and help in the drive for better efficiency and higher profitability.

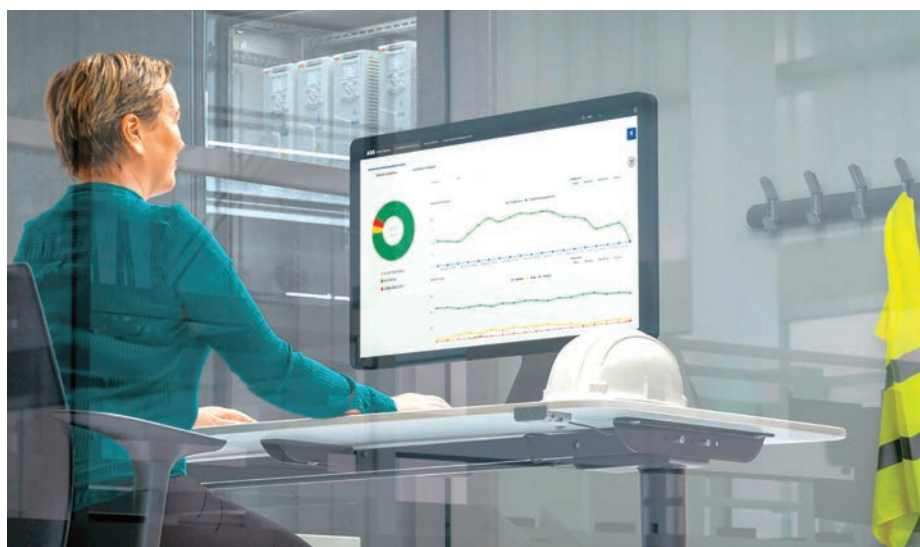
in the 1980s. Since 2016, a commercial lab instrument using this concept has been available as an add-on module for ABB's L&W Fiber Tester — the L&W Crill.

Crill particles are typically 100 times smaller than a pulp fiber, but are important indicators of fiber bonding and strength properties. Unlike the detection of conventional pulp fibers, which depends on image analysis with visible light, this technique compares

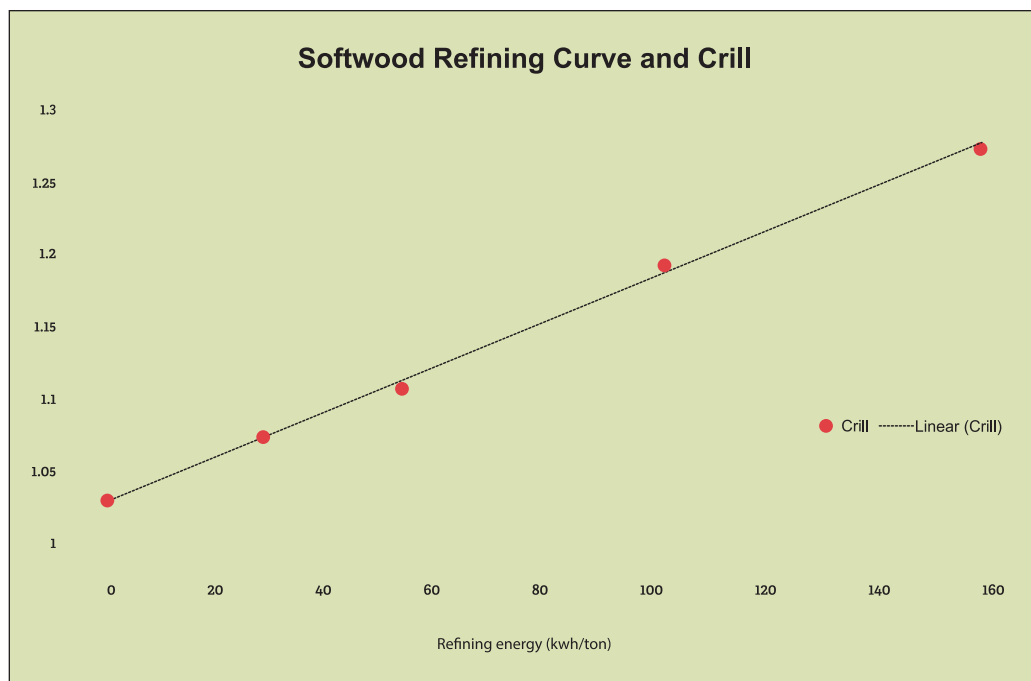
the intensity of two wavelengths of light transmitted through a pulp suspension: ultraviolet light (365 nm) and infrared light (850 nm). The crill content is presented as the crill quota, or the ratio of the UV/IR transmission losses.

The crill measurement technique was originally developed to monitor the process of refining, where crill particles are removed from the fiber wall. A linear relationship was discovered between the crill quota and the refining energy, both in high-consistency mechanical pulp refining and in low-consistency chemical pulp refining. As more facilities for the manufacture of nano-cellulose products are built in the future, crill measurement will become an invaluable tool for quality control and for controlling the refining energy, given that the manufacture of these products can be energy intensive.

Pulp and paper producers looking at more sustainable production would be well-advised to evaluate if their fiber morphology measurements are sufficiently advanced and well suited for the detection and characterization of nano-cellulose fibers.



Techniques for fiber measurement in the lab have existed as long as pulping technologies, but now the industry is at an exciting point where more advanced technology is ready to help make product, process and quality optimization not just possible but easily attainable.



A linear relationship was discovered between the crill quota and the refining energy, both in high-consistency mechanical pulp refining and in low-consistency chemical pulp refining.

Online Testing for Better Quality Control

Paper, board and tissue manufacturers use pulp from a variety of sources, including long-fibered softwood pulps for strength, short-fibered pulps such as eucalyptus for opacity, bulk and softness, and recovered fibers from a variety of species and geographic areas. Those that control their own forestry operations and have integrated pulping operations can rely on a fairly consistent raw material, but need to measure the effect of pulping parameters on fiber quality. In the case of non-integrated operations, understanding the characteristics of the incoming fibers and having the ability to adjust the recipe is imperative to be able to meet customer product specifications.

For many decades, manufacturers have relied on lab tests such as freeness, shive content, size classification and various strength tests performed on handsheets to provide information on the properties of the fibers they are using. While informative, the data from these lab tests are neither timely

enough to make process adjustments nor frequent enough to characterize the variability of fiber properties.

Now, with the advancement of online testing, automated sampling equipment and lab testing –combined with data historians, sophisticated control systems and emerging AI techniques – mill operators can benefit from far more detailed, timely information on fiber quality. These powerful online tools allow quality improvement and variability reduction while lowering manufacturing costs.

Big Data & Artificial Intelligence

Most mills now have data historians that can store thousands of measurements from across the facility at time intervals of seconds to hours, for up to several years, and this data can be used to build powerful predictive models.

Modern fiber morphology analyzers can directly analyze thousands of fiber suspensions, reporting on the deviation of properties such as length, width, wall thickness, shape factor, kink index, fines content, shive content and coarseness.

While such measurements help develop better insights into the characteristics of the pulp furnish, and cost little to perform, their real value only emerges when combined with other online and offline mill data to develop tools for better quality control.

Soft Sensor and Advanced Control Strategies

Soft sensors, or calculated online measurements, offer huge potential value in their use to control the refining process. A soft sensor specific to a mill's process can be built using a combination of lab experiments and machine learning. New advanced process control techniques can then be applied, incorporating a predicted paper strength variable to optimize the refining process.

Today many mills are adopting freeness control given that it is now possible to have frequent, automated and accurate measurement of freeness from automated measurement systems coupled with these online soft sensors. Freeness, however, is a blunt instrument. It is often used as an indicator of the

bonding potential of the pulp, but it is actually a measurement of the drainability of the pulp, which can be important if it limits the speed of the paper or board machine. A lower freeness, however, can be produced in several ways: as a result of refining, from a higher concentration of undesirable low-surface-area ray cells with poor bonding potential, or from shorter fibers.

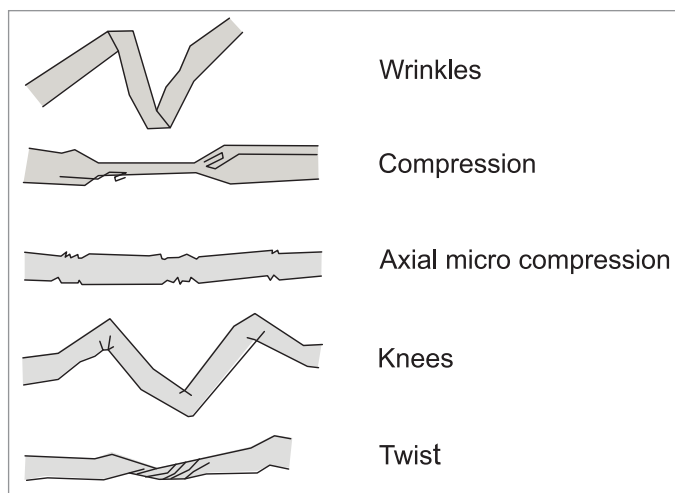
A more practical characterization of pulp uses other measurements of fiber morphology properties, such as the surface area of the pulp calculated from the cumulative length and width of the fibers, which is more directly correlated with the strength of the final product.

As a result, closed-loop control is possible by using the predicted strength properties and fiber morphology parameters to manipulate and accurately control pulp refining and furnish blending operations. Stabilization and continuous control of strength properties can lead to reduced strength variation and improved machine runnability, quality and throughput.

Greater Focus on Understanding Impact of Deformed Fibers as Stretchable Paper Set to Replace Plastic

The stretchability of paper is already important for certain specialty paper products, including sack paper used for cement, chemicals and flour, where flexibility of the paper without tearing is required. Due to increased demand for sustainable products that are bio-sourced, recyclable and compostable, many new paper-based products are being developed to substitute for plastic packaging, with the challenge often being how to maintain the equivalent stretchability of plastic.

One way to overcome this is to produce a network of deformed or curled fibers, which can be achieved through



either chemical or mechanical processes. Deformed fibers create a more elastic paper when the paper is freely dried. To ensure the pulp has the appropriate properties to produce the desired stretch, fiber morphology analyzers can be used to measure a number of properties, including the shape factor and kink index.

Shape factor is an important pulp quality measurement used to determine the straightness of fibers. While a high shape factor correlates well with tensile strength and stiffness, a lower shape factor indicates there are deformations present that enable the fibers to stretch.

The kink index is used to identify local deformations or “knees” in the fibers. To calculate the kink index, changes in the direction of the main axis of the fibers within a limited distance of the fiber are counted when the angle is 20° or greater. Kink measurement correlates well with shape factor in most cases, since local deformations are included in the shape factor.

By using one or both of these measurements and correlating them with the measured stretch of handsheets or the final product, manufacturers can optimize their chemical or mechanical curl-setting treatments to achieve the desired stretchability. This will undoubtedly lead to new extensible

paper products that will become important as sustainable replacements for plastic packaging.

Conclusions

Techniques for fiber measurement in the lab have existed as long as pulping technologies, but now the industry is at an exciting point where more advanced technology is ready to help make product, process and quality optimization not just possible but easily attainable.

The emergence of more rapid and precise measurements, as well as new ways to characterize fiber morphology, both in the lab and online, offer the industry tremendous benefits. Used together with big-data-backed solutions and advanced control strategies, paper manufacturers will be able to improve quality and reduce variability while lowering manufacturing costs. Adopting these technologies to develop the paper products of the future is a great opportunity for investment considering the unique low risk/high reward scenario they offer. ■

Note: This article was first published in *Pulp Paper & Logistics*.

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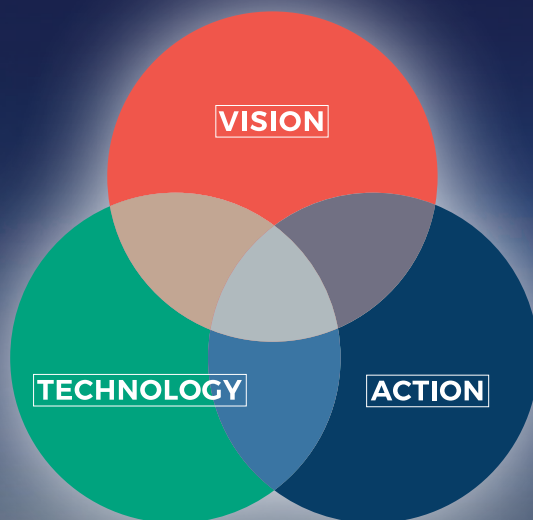
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Consumption of Paper in Europe in 2022 Stable; Production Decreased 5.9%

Brussels-based Cepi has published preliminary 2022 statistics of Europe's pulp and paper industry. According to Cepi, member countries' paper and board production decreased by 5.9% in 2022 compared to the previous year, according to preliminary figures, reflecting the heavy impact on the industry of high energy prices and an abrupt slowdown of the European economy during the second half of the past year. Total production in 2022 reached 84.8 million tonnes, with a decrease reported in almost all paper and board grades with the notable exception of household and sanitary grades.

At the same time, consumption of paper has remained stable in spite of the EU's economic slowdown — its GDP growing by 0.3% in the third quarter and stagnating during the last quarter of 2022 according to the latest estimates. The EU economy is now forecast to grow only by 0.8% in 2023 and by 1.6% in 2024.

Decreased Production/Stable Consumption

The difference between a decreased production and a stable consumption resulted in a strong erosion of the paper trade balance. However, the decrease in production was also observed in the largest producing countries worldwide. Canada, Japan, the United States and South Korea, recorded paper production falls ranging between 0.5% and 3.5%. In Europe, the downward trend can be attributed to a number of factors, chief among them being the cost of energy, which has forced many mills to temporarily stop their machines.

In terms of individual paper grades, the structural divergence in the production trends for graphic grades and packaging

as well as sanitary and household grades continued in 2022. The utilization of paper for recycling by companies in the geographic area covered by Cepi members decreased by 6.4% compared to 2021. High electricity and gas prices have significantly affected recycling mills and non-integrated paper mills especially in the second half of 2022.

Overall, Paper and Board Consumption Remained Stable

The overall consumption of paper and board in Cepi countries in 2022 remained stable compared to 2021, based on the latest data available. It benefited from the favorable economic environment observed during the first half of the year, which was then followed by the abrupt slowing down of the economy during the second half. As a result of recent consumption patterns changes, demand for sanitary and household grades has grown by 3.6% in 2022. Demand for graphic paper was negatively impacted in 2022 (-1.8%) because of the declining demand in printing and publishing. Packaging paper and board demand remained relatively stable (+0.5%) based on figures available for the first 9 months of 2022.

Decrease in Production of All Grades Except Sanitary and Household

The production of packaging grades is estimated to have decreased by 4.6% compared to 2021. Within packaging grades, case materials — mainly used for transport packaging and corrugated boxes — recorded a decrease of 4.8%. The output of carton board plus other packaging board — mainly used for retail packaging — decreased by 4.1%. The production of wrapping

grades — used for paper bag production — decreased by 5.2%. The share of packaging grades accounted for 59.8% (59.1% in 2021) of the total paper and board production, with graphic grades accounting for 26.1% (27.7% in 2021).

Output of all other grades of paper and board — mainly for industrial and special purposes — decreased by 6.1%, with a share of 4.8% of total paper and board production.

Sanitary and household paper output increased by about 2.2% compared to 2021 — to levels close to those reached during the Covid crisis and accounted for 9.3% of total paper and board production. The production of graphic grades fell by 11.3%. After an uptick in 2021, it seems now back on a downward trend.

Newsprint decreased by 9.9% while printing and writing papers decreased by 11.5% as a result of machine closures and conversions. The production of printing and writing papers — used for magazines and catalogues, direct mail, directories, etc. — decreased at different rates depending on precise grade categories. Output of coated mechanical paper and uncoated mechanical paper decreased by 19.5% and 13.2% respectively. Uncoated woodfree grades — copy paper — have decreased by 5.8%, and coated woodfree grades by 12.0%.

Overall, this means that production of coated and uncoated graphic papers decreased by 15.8% and 8.5% respectively. Production of woodfree graphics showed a decrease of 8.0%, while output of mechanical graphic papers fell by 16.3%. ■

Cepi Preliminary Statistics 2022 summary report with charts and graphs can be found on Cepi's website: www.cepi.org (4-page PDF).

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