

**MIDLAND**



PACKAGING • PAPER • PERFORMANCE

# MARKET UPDATE

DECEMBER 2022

- **Pixelle Specialty Solutions to the Close Androscoggin Mill in Jay, Maine and Restart Paper Machine 24 in Chillicothe, Ohio**
- **Arjowiggins Placed into Administration Due to Spiraling Energy and Raw Materials Costs**
- **Sappi Sells Three European Graphic Paper Mills to Aurelius Investment Group**
- **Mohawk and Fedrigoni Reach Financing Agreement, Set Stage for Potential Acquisition**
- **Stora Enso Divests Two (of Planned Four) Paper Mills; Focus on Strategic Growth Areas**
- **Georgia-Pacific Closing Two Corrugated Mills**
- **ND Paper Rationalizing Grades and Weights and discontinuing their Escanaba Brand**
- **Paper Excellence Acquisition of Resolute Forest Products Expected to Close in 2023 H1**
- **Russian Invasion of Ukraine has Continued Impact on Paper Market Input Costs**
- **USPS Temporary Packaging Rate Adjustment for Holiday Season Implemented**
- **Postal Regulatory Commission Approves January 22<sup>nd</sup> Rate Hike**

Mill shutdowns and conversions over the past few years considerably reduced the overall paper supply. The unexpected Evergreen Pine Bluff and Resolute Calhoun mill shutdowns late last year, and the recently announced Pixelle Androscoggin mill closure, added to that decline. ND Paper surprised the market by announcing that they will convert an additional 260,000 tons of graphic papers to packaging grades at Biron by year end.

The ongoing Russian invasion of Ukraine has added to the strain on supply with increased fuel and starch input costs.

Factoring in historic low mill inventories and reduced imports, and we have seen high mill operating rates that will continue through year end.

High fuel, coal, and energy costs, transportation and supply chain challenges, hiring challenges to run paper machines, and high pulp and other input (titanium dioxide, caustic soda, starch, latex, cotton) costs add fuel to the fire.

We continue to see companies enter the catalog and direct mail marketplace for the first time because of digital marketing constraints along with a rekindled awareness of the proven cost-effectiveness and ROI of direct mail.

These conditions mentioned provided the backdrop for paper mills to rationalize and eliminate less-desirable grades and basis weights from their product offering, revise their freight policies, add fuel surcharges, and fully implement a series of price increases across every grade line over the past two years. This led to an allocated and oversold market where securing paper and delivering it on time has been an overwhelming challenge that we are still trying to navigate and recover from.

Though mill operating rate forecasts remain strong, demand has weaned a bit as we are seeing relative softening due to inventory corrections, an uncertain economy, persistent supply chain issues, and seasonality.

## Mill / Machine Closures and/or Bankruptcies:

- Norpac PM1 Longview, WA, White Birch Ashland, RFP Thorold idled – 900,000 tons of newsprint
- Resolute Forest Products Catawba PM2 – 193,000 tons of coated groundwood (2017 Q3)
- Resolute Calhoun PM3 and PM5 – 435,000 tons of uncoated mechanical (2017 Q3)
- Glatfelter Chillicothe PM24 – 57,000 tons of uncoated freesheet (2017 Q3)
- Verso Androscoggin PM3 – 215,000 tons of coated (2017 Q3)
- Appleton Coated – 300,000 tons, mix of coated, uncoated and C1S freesheet (2017 Q4)
- West Linn – 267,000 tons, mix of coated and uncoated and C1S freesheet (2017 Q4)
- UPM Blandin PM5 - 128,000 tons of coated groundwood (2017 Q4)
- Georgia Pacific Camaas PM20 – 237,000 tons of uncoated freesheet (2018 Q2)
- Flambeau River PM3 – 70,000 tons of uncoated freesheet (2018 Q1)
- Nippon Paper Group: Fuji, Jekkaido and Kushiro – 531,000 tons (2019-20)
- Georgia Pacific Port Hudson, LA mill – 630,000 tons (2019)
- Verso Luke, MD mill – 450,000 tons (2019 Q2)
- Flambeau River Papers Chapter 128 Filing – 20,000 tons (2019 Q2)
- UPM Plattling, Germany PM 10 - 155,000 tons (2019 Q2)
- Norske Albury Mill – 265,000 tons of newsprint (2019 Q4)
- Domtar PM A63 at Ashdown and PM PH6 at Port Huron – 204,000 short tons (2019 Q3)
- Greif, Inc. PM1 at Mobile, AL – 64,965 tons of uncoated recycled board (2019)
- UPM Rauma, Finland PM2 – 265,000 tons of SC (2019 Q4)
- Resolute Forest Products Augusta, GA – 214,000 tons of newsprint (2019 Q4)
- UPM Chapelle, Grand-Couronne, France – 240,000 tons of newsprint (2020 Q1)
- Verso Duluth and Wisconsin Rapids Mills – 810,000 tons of coated and super cal (2020 Q2)
- Pondaray Newsprint Company, Newport, WA Mill (2020 Q2)
- Sappi Stockstadt Germany and Westbrook, ME Mills (2020 Q3 and Q4)
- Domtar Ashdown, AR, Port Huron, MI, and Kingsport, TN mills – 720,000 short tons (2021 Q1)
- UPM Kaipola, Finland – 270,000 tons (2020 Q4)
- WestRock, Evadale, TX – 200,000 tons of SBS (2020)
- Norske Skog Saugbrugs, Norway PM5 Shutdown – 110,000 tons of SC (2020 Q4)

## Mill / Machine Closures and/or Bankruptcies (continued):

- Stora Enso Veitsiluoto Pulp and Paper Mill – 790,000 tons of uncoated freesheet (2021 Q3)
- Stora Enso Kvarnsveden Pulp and Paper Mill – 565,000 tons of SC (2021 Q3)
- Evergreen Packaging Pine Bluff Arkansas Mill – 180,000 tons of coated groundwood (2021 Q4)
- Resolute Forest Products Calhoun, TN Mill – 164,245 tons of uncoated freesheet (2022 Q1)
- WestRock Panama City, FL Mill – 645,000 tons of Packaging grades (2022 Q2)
- Pixelle Specialty Solutions Androscoggin Mill, Jay, MN – 230,000 tons specialty (2023 Q1)
- Paper Excellence Catalyst Crofton Mill – paper production Curtailment – (2022 Q4)
- WestRock St. Paul, MN Mill – 200,000 tons of Corrugated Medium (2022 Q4)
- Georgia-Pacific Oshkosh, WI – Corrugated Medium (2022 Q4)
- Georgia-Pacific Dubuque, IA – Corrugated Medium (2022 Q4)

## Mill / Machine Conversions:

- Sappi Somerset PM1 – Rebuild to add packaging capabilities 198,000 tons (2018 Q2)
- Verso Jay PM3 – Restart as packaging machine in (2018 Q3)
- Packaging Corp of America Boise Wallula, WA – 200,000 tons of packaging & kraft liner
- Kruger Trois Rivieres PM10 – Recycled lightweight linerboard (2017 Q4)
- ND Paper Biron PM B25 – 120,000-ton conversion to medium and linerboard (2019)
- Oji Paper Tomakomai PM5 – 200,000-ton conversion to packaging (2020)
- New-Indy – 350,000-ton conversion to packaging (2020 Q3)
- Int'l Paper Selma PM15 – 235,000 tons of UFS converting to linerboard (2020)
- ND Paper Rumford R12 – 110,000 tons converting to specialty packaging (2020 Q3)
- Stora Enso Oulu – 1,080,000 tons conversion to packaging & kraft line (2020 Q3)
- SCA Ortviken, Sweden – 756,000 tons (2021)
- ND Paper Rumford R15 – 280,000 tons of CFS/CGW converting to linerboard (2020 Q4)
- ND Paper Biron B26 – 260,000 tons of CGW converting to packaging (2022)

## Mill Acquisitions and Mergers:

- Manchester Industries acquired by Clearwater Paper (2016)
- Tembec acquired by Rayonier Advanced Materials (2017)
- Multi Packaging Solutions acquired by WestRock (2017)
- KapStone Paper and Packaging acquired by WestRock (2018)
- Mondi Pine Bluff kraft mill acquired by Twin Rivers Paper Company (2018)
- Crane Stationary Corp. acquired by Mohawk Fine Papers, Inc. (2018)
- Appvion acquired by Franklin Advisors, Inc. (2018)
- Norske Skog AS acquired by Oceanwood investment management firm (2018)
- Catalyst Biron and Rumford mills acquired by Nine Dragons Paper (2018)
- Expera Specialty Solutions acquired by Ahlstrom-Munksjo (2018)
- White Birch Bear Island acquired by Cascades, Inc. (2018)
- Schluter Print Pharma Packaging acquired by WestRock (2018)
- Verso Wickliffe Mill acquired by Global Win Wickliffe LLC (2018 Q3)
- Glatfelter Specialty Papers Business Unit acquired by Lindsay Goldberg (2018)
- Clearwater Paper's Ladysmith facility acquired by Dunn Paper, Inc. (2018 Q3)
- Resolute Forest Products Fairmont, WV Pulp mill acquired by ND Paper (2018)
- Resolute Forest Products Catawba mill acquired by New-Indy (2018)
- Catalyst Pulp & Paper acquired by Paper Excellence Canada (2018)
- OTM Holdings (Old Town) pulp mill acquired by ND Paper (2018)
- Carthage Specialty Paperboard assets acquired by Ox Industries (2018)
- Carastar Industries acquired by Greif, Inc. (2019 Q1)
- Int'l Paper APPM Ltd (India) acquired by West Coast Paper Mills Ltd (2019)
- Verso Androscoggin & Stevens Point mills acquired by Pixelle (2020)
- Midwest Paper acquired by Industrial Opportunity Partners (2020)
- Appvion Point of Sale business acquired by Domtar (2020 Q2)

## Mill Acquisitions and Mergers (continued):

- Appvion Specialty Paper Business acquired by Pixelle (2021 Q2)
- Midwest Paper acquired by McKinley Paper Company, Bio PAPPEL (2022 Q1)
- Verso Acquisition by BillerudKorsnäs (2022 Q2)
- Schweitzer-Mauduit International and Neenah Merger (2022 H2)
- Pixelle Specialty Solutions acquired by H.I.G. Capital (2022 Q2)
- Domtar Kamloops Pulp Mill acquired by Kruger (2022 Q2)
- Nekoosa acquired by Appvion (2022 Q4)
- Resolute Forest Products acquired by Paper Excellence (2023 H1)
- Stora Enso Maxau Germany Mill acquired by Schwarz Group (2023 Q1)
- Stora Enso Nymölla Sweden Mill acquired by Sylvamo (2023 Q1)
- Sappi Maastricht, Stockstadt, and Kirkniemi mills acquired by Aurelius (2023 Q1)

## Mill / Machine Re-Starts:

- Norpac restarts PM1 Longview, WA (2018 Q2)
- Appleton Coated mill restarts as Midwest Paper Group (2018 Q2)
- White Birch Paper restarts Bear Island mill in Virginia (2018 Q3)
- Wickliffe mill restarts as Phoenix Paper/Shanying International (2019 Q2)
- West Linn Paper Co. mill restarts as Willamette Falls Paper Co. (2019 Q3)
- Domtar Ashdown A62 paper machine restart (2022 Q1)
- Pixelle Specialty Solutions restarts PM24 in Chillicothe, OH (2023 Q1)

## Printer Acquisitions / Partnerships / Mergers:

- Creel Printing – acquired by LSC Communications (2017)
- Fairrington Transportation – acquired by LSC Communications (2017)
- Publishers Press – acquired by LSC Communications (2017)
- Sheridan Group – acquired by CJK Group (2017)
- Earth Color – acquired by the Mittera Group (2017)
- Universal Printing Co. – acquired by Henry Wurst (2017)
- Webcrafters – acquired by CJK Group (2017)
- NCL Graphics Specialties – acquired by Fort Dearborn (2018)
- Ivie & Associates – acquired by Quad/Graphics (2018)
- Rise Interactive – Quad/Graphics acquired majority interest (2018)
- Trend Offset Walton, KY plant – acquired by Arandell (2018)
- Coveris Americas – acquired by Transcontinental Inc. (2018)
- TriLiteral LLC – acquired by LSC Communications (2018)
- LSC Communications 5 Retail Offset Facilities – acquired by Trend Offset (2018)
- RR Donnelley Print Logistics Business – acquired by LSC Communications (2018)
- James Printing – acquired by Modern Litho (2018)
- MAZ Systems Incorporated – acquired by LSC Communications (2018)
- Great Atlantic Graphics LLC - acquired by Alcom Printing Group (2018)
- Trio Printing - acquired by Modern Litho (2018)
- Dickson Press and Kingsport Book – acquired by CJK Group (2018)
- Webcom – acquired by Marquis Book Printing, Inc. (2018)
- Atlantic Press – acquired by Fisher Printing (2018)
- Periscope – acquired by Quad (2019)
- Henry Wurst Kansas City Division – acquired by the Mittera Group (2019)
- Signmasters, Inc. – acquired by Sandy Alexander, Inc. (2019)
- HM Graphics – acquired by John Roberts (2019)
- Thomson-Shore - acquired by CJK Group (2019)
- Cenvo (Long Run Label and Receipt Paper assets) acquired by Iconix LLC (2019)
- Automated Packaging Systems acquired by Sealed Air (2019)
- Sprint Denver, Inc. acquired by the Mittera Group (2019)
- DTX Company – investment and partnership with Quad (2019)
- Flesh Company – acquired by Ennis, Inc. (2019)
- Primary Color Systems and Coloredge Inc. merger (2019)
- LSC Communications commingle business (Aurora, IL) – acquired by United Business Mail (2019)
- Ripon Printers acquired by Walsworth (2019)
- Quad Omaha Packaging plant - acquired by Graphic Packaging International (Q1 2020)
- Haapanen Brothers – acquired by Nosco, Inc. (Holden Industries, Inc.) – (Q1 2020)
- Apple Tree Group – acquired by Quad/Graphics (Q1 2020)
- Colortree Printing – acquired by Moore (Q1 2020)
- Quad Versailles, KY Book Plant – acquired by CJK Group (Q3 2020)
- Cenvo Cadmus Lancaster, PA and Hurlock, MD locations - acquired by Intellicor Comm (Q2 2020)
- Cenvo Publisher Services and Cenvo Learning – acquired by CJK Group (Q3 2020)
- LSC Communications – acquired by Atlas Holdings (Q3 2020)
- LSC Creel Las Vegas, NV – reacquired by Allan Creel (Q4 2020)
- Arandell – Asset purchase agreement by Saohair Capital Partners (Q4 2020)
- Quad Fairfield, PA and Martinsburg, WV Book Plants – acquired by Bertelsmann Printing Group/Berryville Graphics (Q4 2020)
- Trend Offset – acquired by the Mittera Group (Q1 2021)
- Lake Book Manufacturing – acquired by Grafica Veneta (Q1 2021)
- Creel Printing Asset Sale to the Mittera Group (Q2 2021)
- Cenvo Amarillo TX, San Antonio TX and Eureka, MO – acquired by ColorArt LLC/JAL Equity (Q2 2021)
- Suncraft Technologies – Acquired by Freedom (Q3 2021)
- C,J, Krehbiel Company – Acquired by BR Printers (Q4 2021)
- Times Printing LLC – Acquired by CJK Group / Sheridan (Q4 2021)
- **RR Donnelley & Sons Company – Acquired by Chatham Asset Management (Q1 2022)**
- **Intellus Marketing Mail Division Assets – Acquired by Nahan (Q2 2022)**

## Printer Closures:

- Central Florida Press, Orlando, FL (2017)
- Quad/Graphics - Waseca, MN (2017)
- Quad/Graphics - Taunton, MA (2017)
- LSC Communications - Long Prairie, MN (2018)
- Quad/Graphics - Dallas, TX (2018)
- Edwards Brothers Malloy (2018)
- Pinnacle Press, Hayward CA (2018)
- Jones Printing, Chattanooga, TN (2018)
- T+J Graphic Arts, Redwood City, CA (2018)
- Ace Printing, San Rafael, CA (2018)
- Quad/Graphics - Hazleton, PA (2018)
- Vanguard Printing, Ithaca, NY (2018)
- James E. McGirr, Plymouth, MA (2018)
- Bethany Printing Company, Bethany, MO (2018)
- Quad/Graphics - Franklin, KY (Q1 2019)
- LSC Communications - Lynchburg, VA (Q2 2019)
- McCormick Armstrong, Wichita, KS (Q1 2019)
- North American Communications, Duncansville, PA (Q2 2019)
- Torstar Corp, Hamilton, ON, Canada (Q3 2019)
- Amsterdam Printing & Litho, Amsterdam, NY (Q2 2019)
- Quad - Midland, MI (Q3 2019)
- LSC Communications - Torrance, CA (Q3 2019)
- Quad - Shakopee, MN ((Q3 2019)
- Sentinel Printing, St. Cloud, MN (Q4 2019)

## Printer Closures (continued):

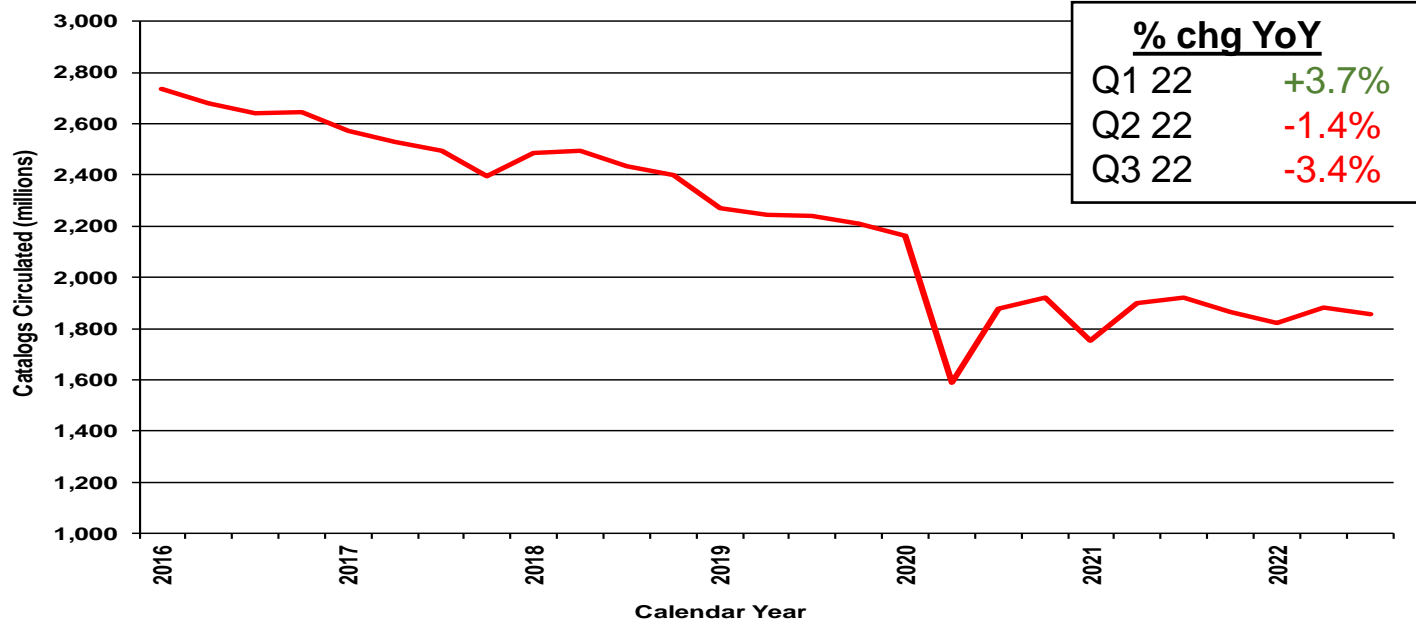
- LSC Communications - National Pub, Philadelphia, PA (Q4 2019)
- Quad - Riverside, CA, Portland, OR and Charlotte, NC (Q1 2020)
- Whitehall Printing Company, Naples, FL (Q1 2020)
- LSC Communications - Strasburg, VA, Glasgow, KY and Mattoon, IL (Q3 2020)
- Sinclair Printing, Los Angeles, CA – winds down operations (Q1 2020)
- Cenvéo - Cadmus, Richmond, VA (Q2 2020)
- Thoroughbred Printing, Lexington, KY (Q2 2020)
- Jostens, Visalia, CA (Q4 2020)
- RRD Hennegan, Florence, KY (Q3 2020)
- Arandell, Walton, KY (Q3 2020)
- LSC Communications – Kendallville, IN (Q4 2020)
- Quad Oklahoma City (Q1 2021)
- LSC Spartanburg, SC (Q1 2021)
- RRD Lewisburg, PA (Q4, 2021)

## Printer Bankruptcy History:

- Boss Litho, Inc. City of Industry - Chapter 11 Filing (2018)
- Cenvéo, Inc. - Chapter 11 Filing (2018)
- Medallion Press, Inc. – Chapter 7 Filing (2018)
- Scheffer Printing, LLC – Chapter 7 Filing (2020)
- LSC Communications – Chapter 11 (2020)
- Arandell – Chapter 11 (2020)

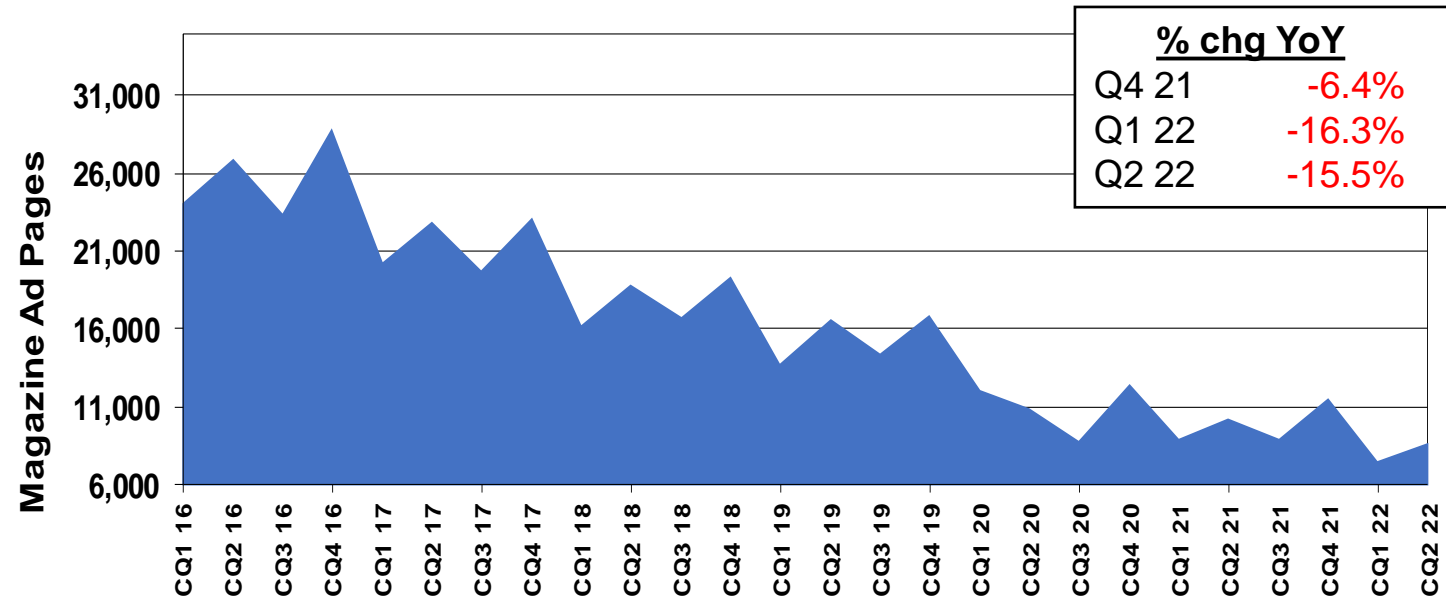


# MAGAZINE AD PAGES AND CATALOG CIRCULATION

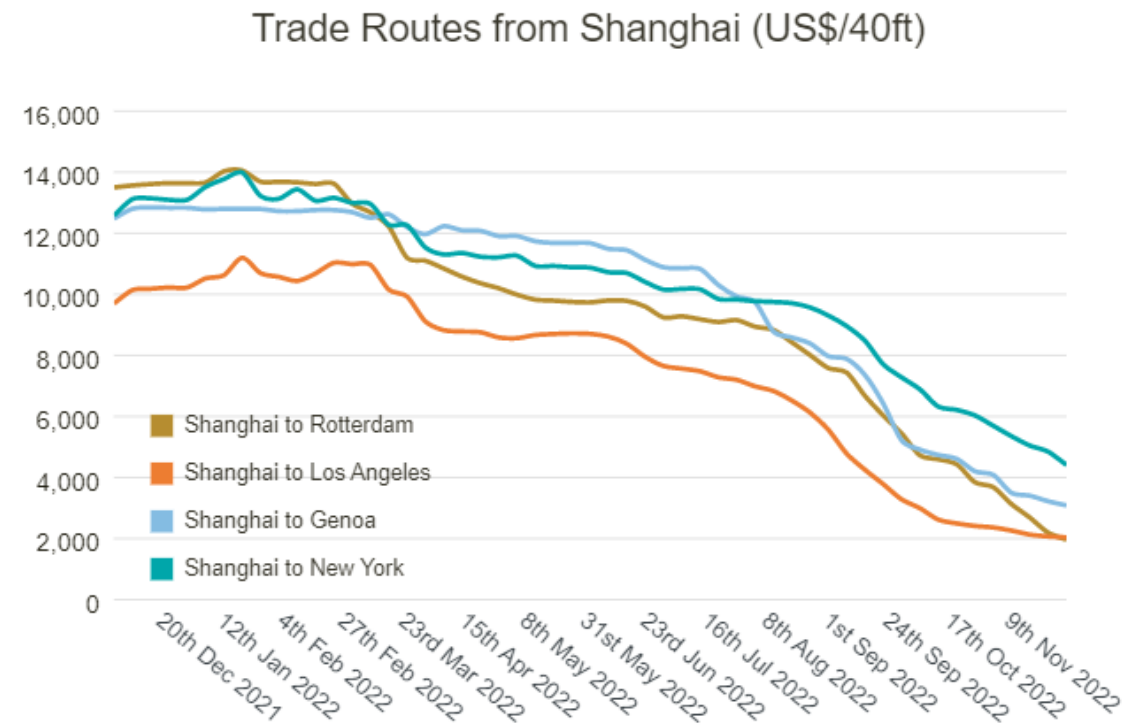
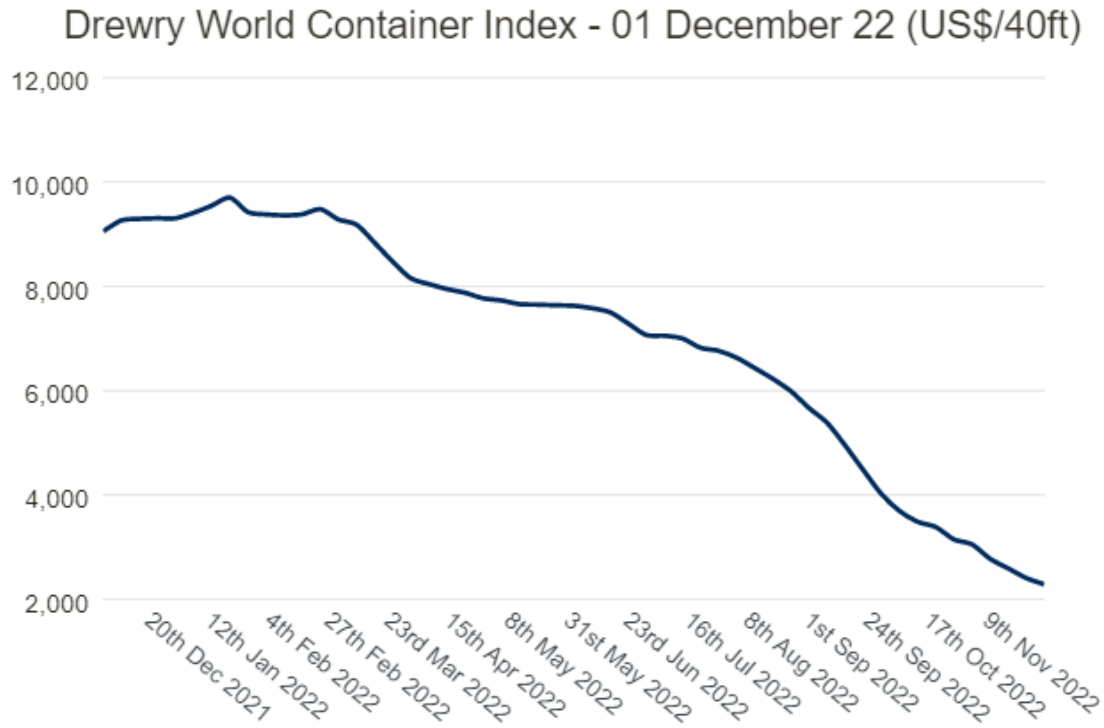


Catalog Circulation was **down 3.4%** in 2022 Q3 versus the same quarter in 2021.

Magazine Ad Pages were **down 15.5%** in 2022 Q2 versus the same quarter in 2021



# SHIPPING CONTAINER CHALLENGES AND HIGH COSTS



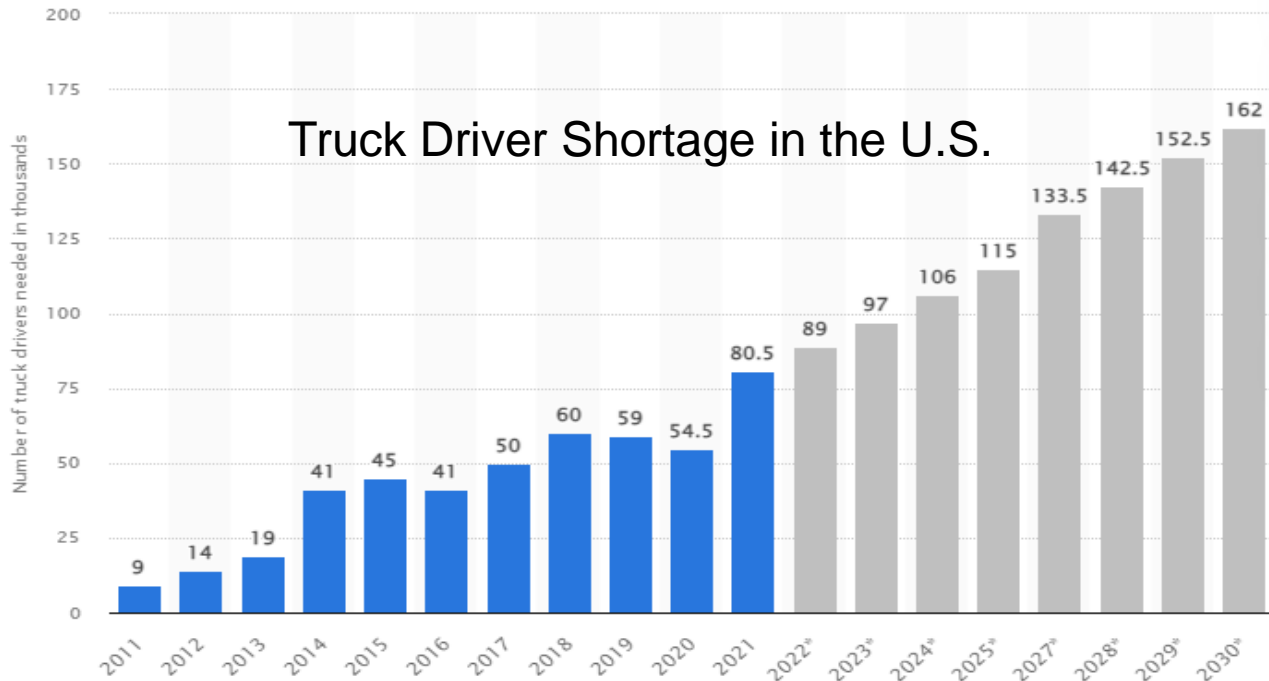
The Drewry World Container Index (WCI), which measures the price of a shipping container, is at \$2,284, the 40<sup>th</sup> consecutive weekly decrease, which is 75% lower than one year ago and now 78% below the peak reached in September 2021 of \$10,377. This is 10% lower than the ten-year average, but it remains 61% higher than average 2019 (pre-pandemic) rates.

The average composite index of the WCI year-to-date is \$6,731 per 40 ft container, which is \$4,039 higher than the 10-year average of \$2,693.

The global shortage of shipping containers, initially caused by the pandemic, led to drastic inflation in shipping and container prices and increased delay times for companies that move items all over the world.

All the links in the supply chain remain somewhat stretched: Ships, Ship Mooring Space, Containers, Warehouse Space, and Trucks

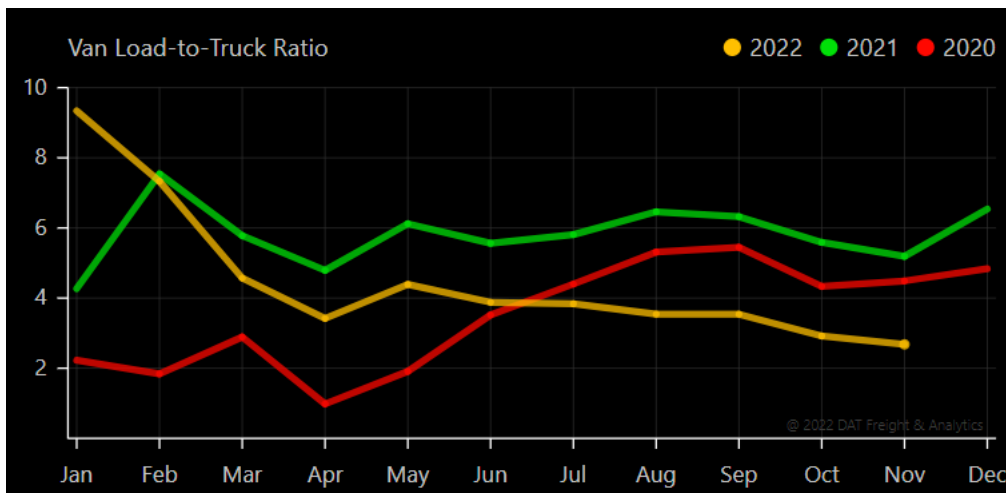
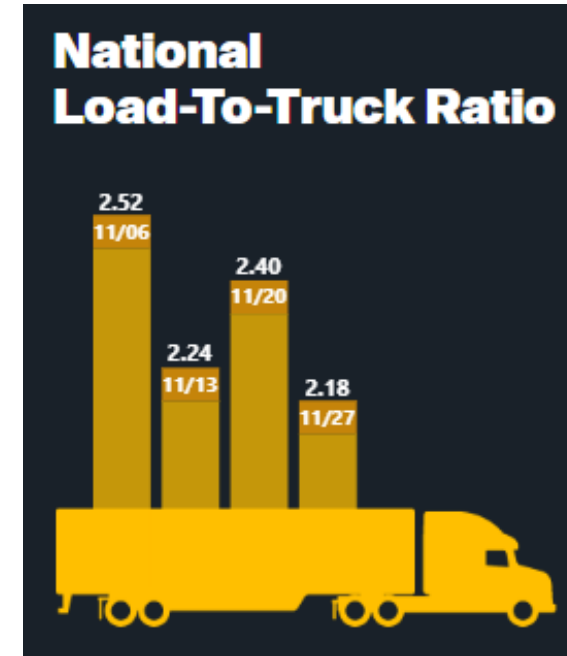
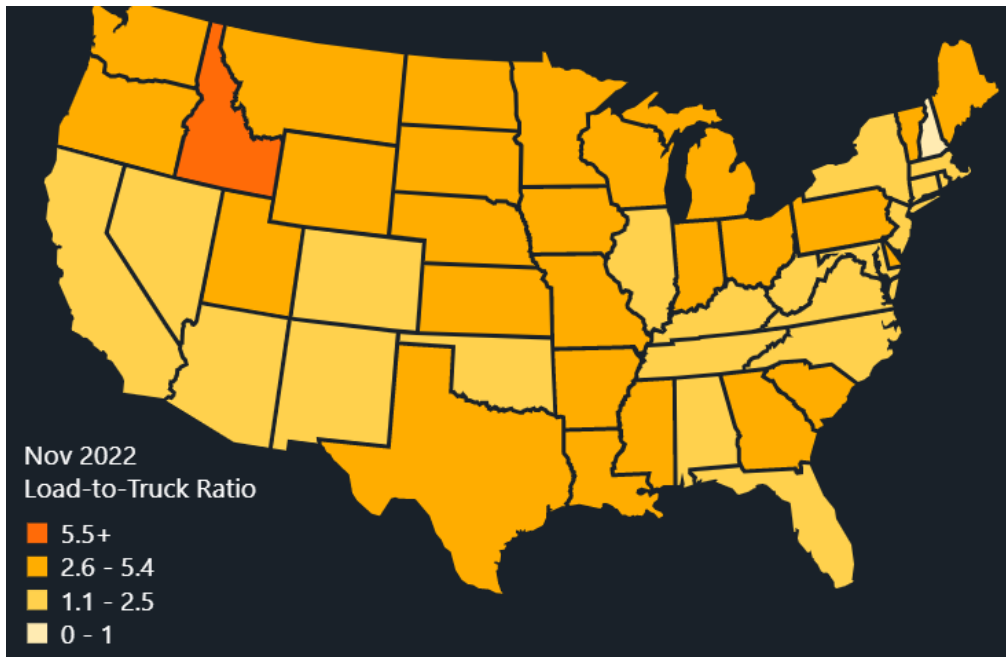
# TRUCK DRIVER SHORTAGE TREND



- Over the next decade the trucking industry will need to hire roughly 898,000 new drivers (90,000 drivers per year) to replace retiring truck drivers and industry growth. America will be short 175,000 drivers by 2026. The average age of a commercial truck driver in the U.S. is 55 years old. The shortage is most acute for long-haul drivers, where the average age is 46, and workers are on the road for weeks at a time.
- The Electronic Logging Device mandate required all motor carriers to install this equipment on their trucks to automatically track drivers' hours of service. New government regulations allow no more than 11 hours of driving, followed by a mandatory and continuous rest period of 10 hours.
- The median annual wage for heavy and tractor-trailer truck drivers in the U.S. was \$47,130 in 2020. As of October 27, 2022, the **national average annual pay was \$56,481**.
- There is a trend of more owner operators in the market, allowing drivers to be more selective with the loads they take, leading to spot capacity price escalation and pressures on driver availability.



Sources: Statista, American Trucking Associations Truck Driver Shortage Analysis 2021, FleetOwner, Truck Driver Shortage on Course to Double in a Decade 2019, and Truckdriverssalary.com



The Load-to-Truck ratio is a sensitive, real-time indicator of the balance between spot market demand and capacity, which can signal impending rate changes.

The November 2022 Van Load-To-Truck ratio is **down 48.2%** compared to November 2021.

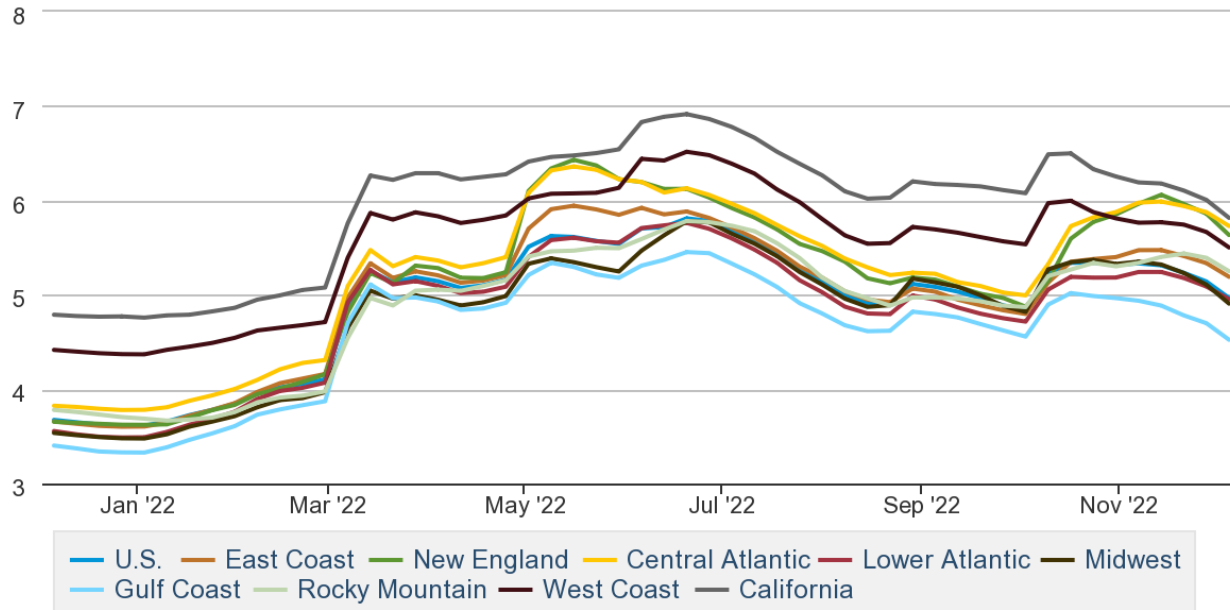
Van Spot Rates are **down 18.5%** over November 2021.

# DIESEL FUEL PRICES AND VAN HAUL RATES



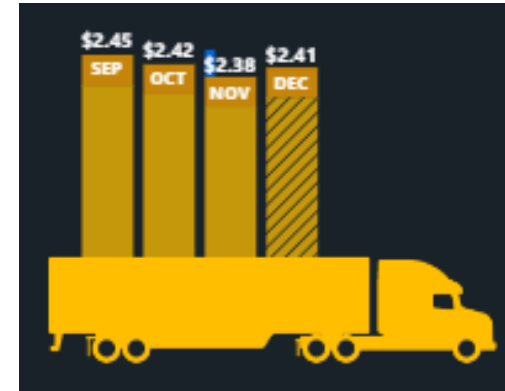
## On-Highway Diesel Fuel Prices

(dollars per gallon)

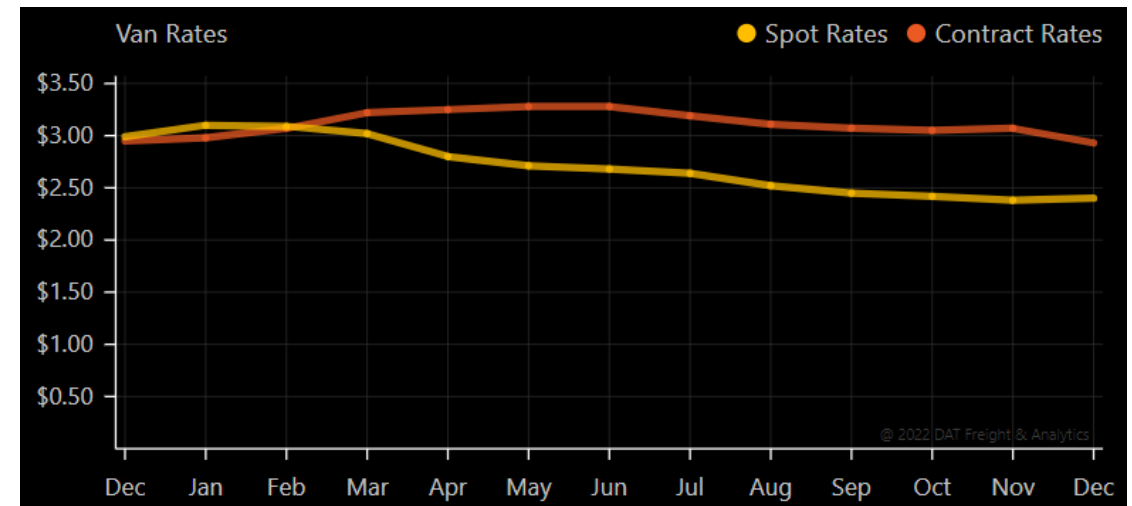


Data source: U.S. Energy Information Administration

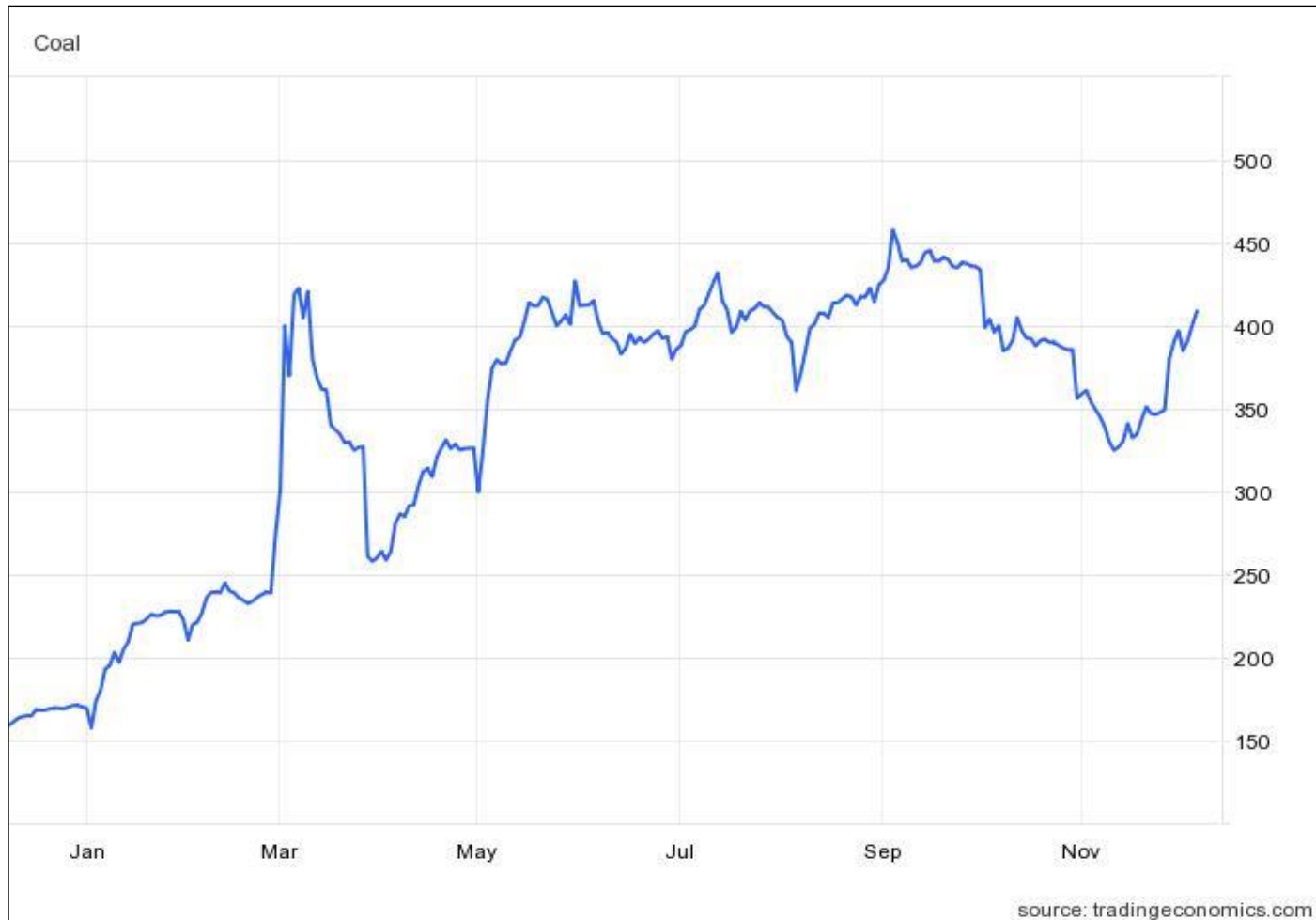
The national average diesel fuel price is off the all-time summer highs, currently at **\$5.14 per gallon**.



Van haul contract rates have been mostly flat over the past few months.



## INPUT COSTS REMAIN HIGH - COAL



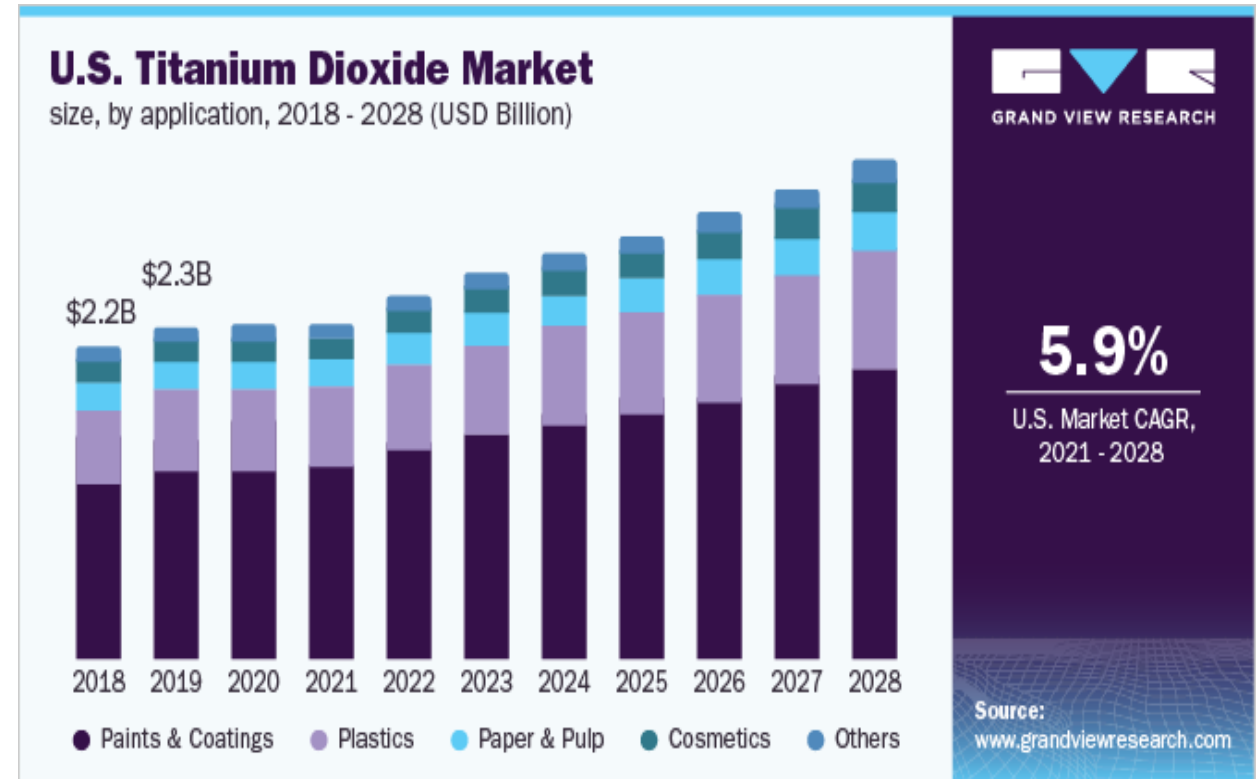
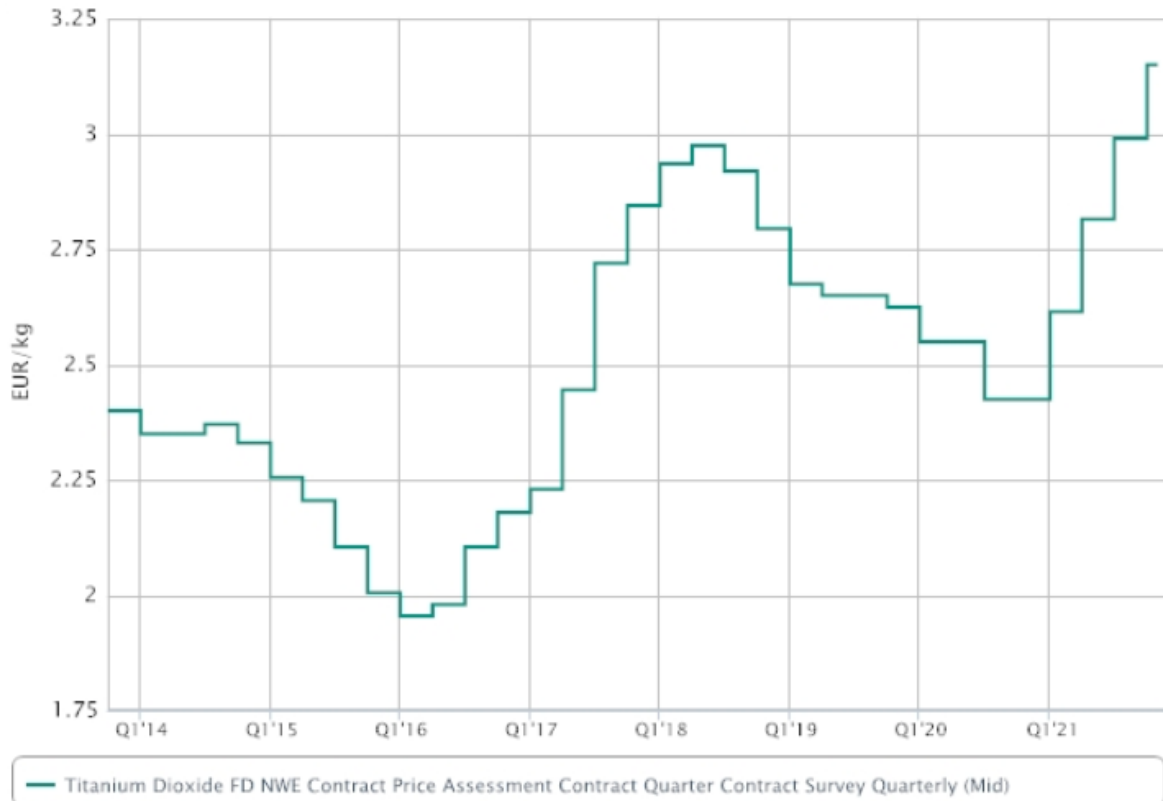
The U.S., while relying on domestically produced coal, is not immune to rising prices.

Coal prices are back on the rise, currently at **\$408.80 per ton** (12/6/22), getting closer to the peak of \$435. Coal is expected to trade at \$462 USD/MT by the end of this quarter and estimated to trade at \$550 in 12 months time.

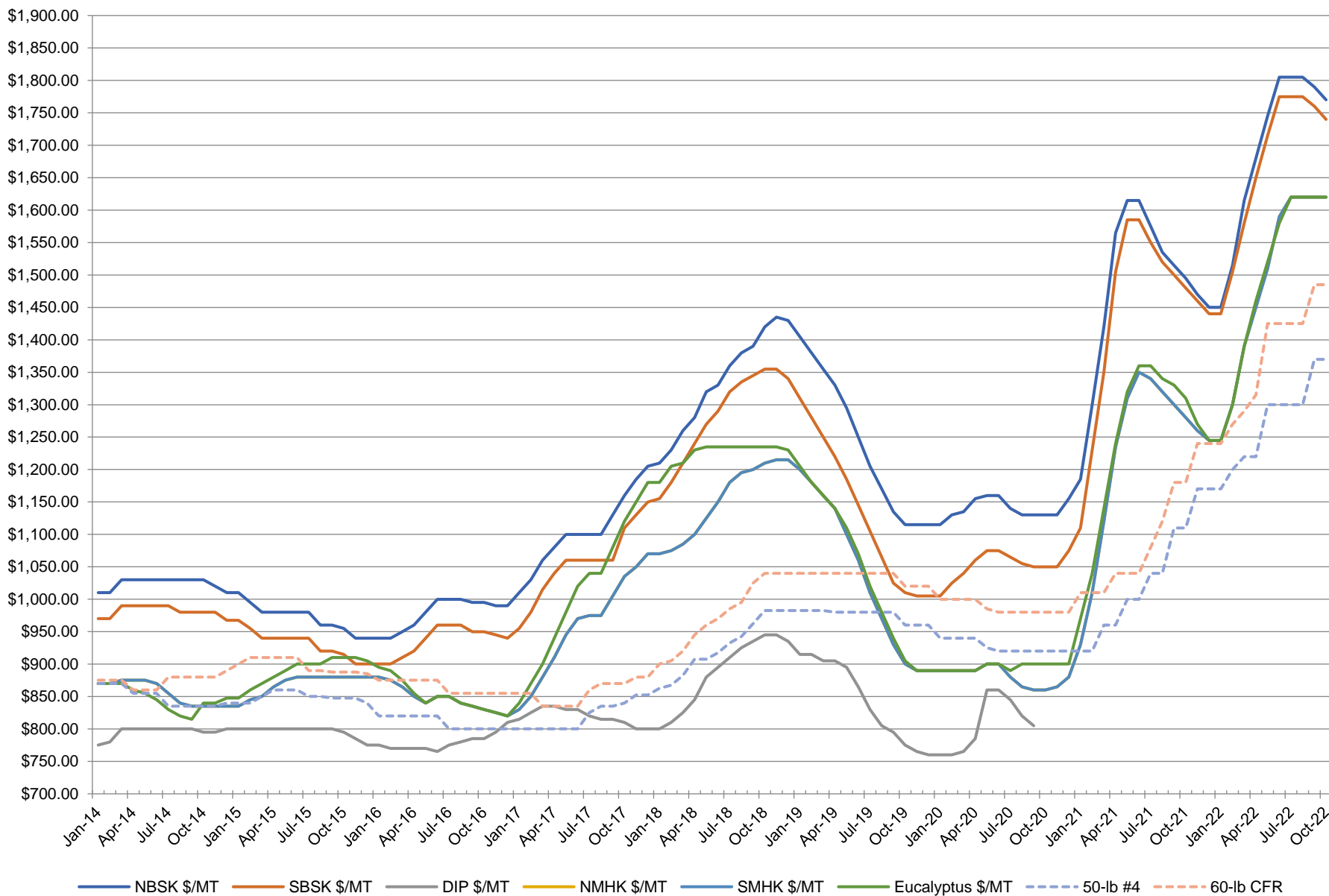
As expected, US coal-fired generation fell seasonally, but demand for coal remained unfulfilled during this year's shoulder months thanks to sluggish production response and critical infrastructure delays.

Major producers suggest that production will increase through the year as they hire and train more employees and increase productivity. However, until railcar availability improves, stockpiles at mines will continue to grow and stockpiles at coal plants will continue to shrink until railcar availability improves.

TiO<sub>2</sub> is a filler used in the papermaking process to make paper whiter and stronger.



# NORTH AMERICAN MARKET PULP PRICES



## Market pulp prices pull back slightly from all-time highs.

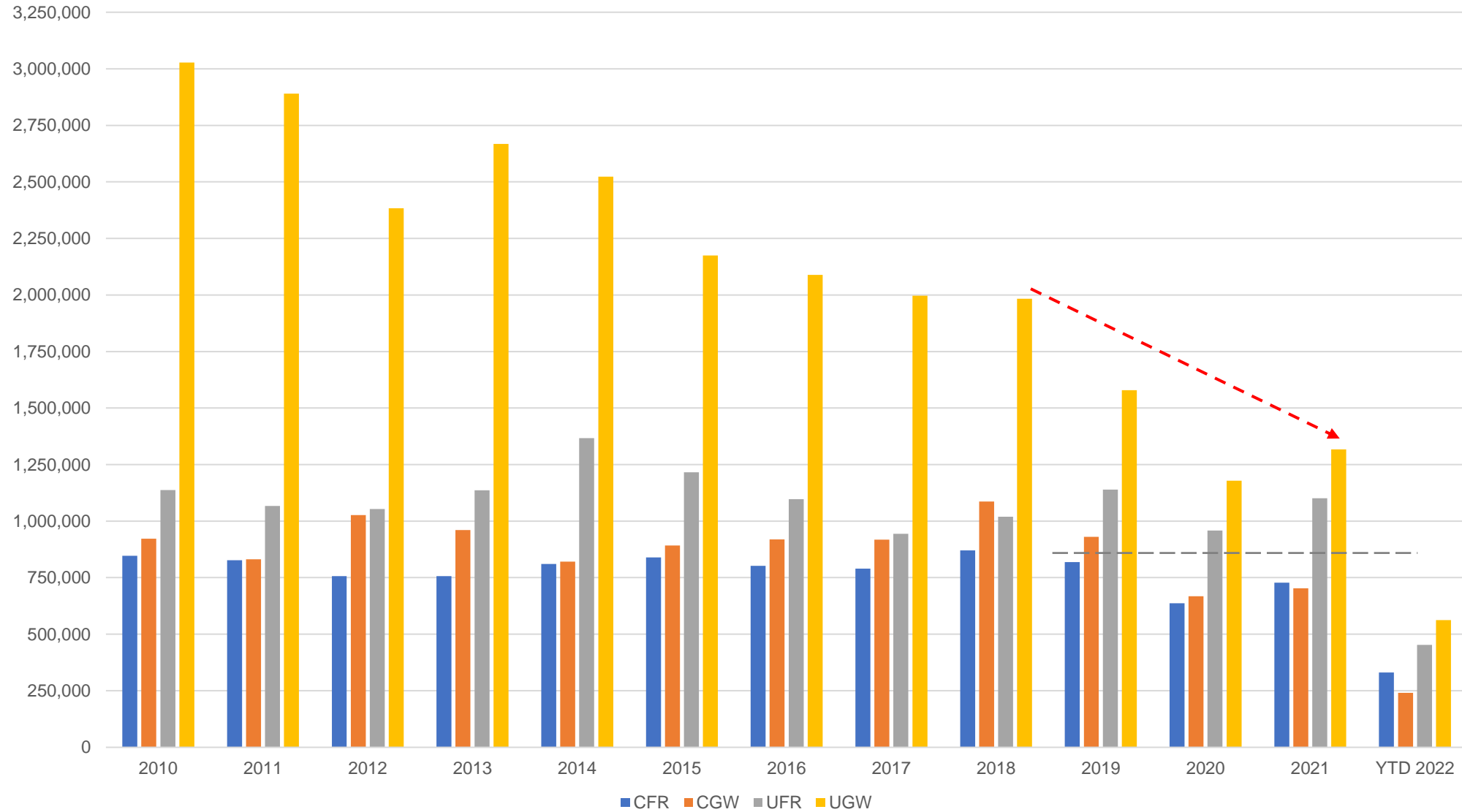
This is a significant contributing factor to the continuous mill price increase announcements.

The steep rise from 2016 through 2018 (at the time, that was a ten-year high), had a huge impact on non-integrated mills (those that do not manufacture their own pulp), which led to several notable mill closures.

With prices far exceeding those levels today, it continues to create a significant challenge for non-integrated paper mills.



## US Imports



# RISI PAPER TRADER TABLE A6



Delivered Prices (US dollars per ton)	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022
<b>US PRICES</b>														
<b>Uncoated freesheet papers</b>														
20-lb copy paper 92 bright	1,180	1,260	1,260	1,260	1,300	1,340	1,340	1,430	1,430	1,430	1,430	1,495	1,495	1,495
%	0.0	6.8	0.0	0.0	3.2	3.1	0.0	6.7	0.0	0.0	0.0	4.5	0.0	0.0
50-lb offset rolls 92 bright	1,075	1,155	1,155	1,155	1,195	1,235	1,235	1,325	1,325	1,325	1,325	1,390	1,390	1,390
%	0.0	7.4	0.0	0.0	3.5	3.3	0.0	7.3	0.0	0.0	0.0	4.9	0.0	0.0
20-lb formbond stock tab	1,165	1,245	1,245	1,245	1,285	1,325	1,325	1,415	1,415	1,415	1,415	1,480	1,480	1,480
%	0.0	6.9	0.0	0.0	3.2	3.1	0.0	6.8	0.0	0.0	0.0	4.6	0.0	0.0
<b>Coated papers</b>														
Premium 80-lb sheets	1,590	1,650	1,650	1,650	1,680	1,700	1,730	1,810	1,810	1,890	1,890	1,950	1,950	1,950
%	0.0	3.8	0.0	0.0	1.8	1.2	1.8	4.6	0.0	4.4	0.0	3.2	0.0	0.0
Economy 80-lb sheets	1,353	1,413	1,413	1,413	1,443	1,463	1,488	1,600	1,710	1,710	1,710	1,770	1,770	1,770
%	0.0	4.4	0.0	0.0	2.1	1.4	1.7	7.6	6.9	0.0	0.0	3.5	0.0	0.0
No. 3 60-lb rolls	1,180	1,240	1,240	1,240	1,270	1,290	1,315	1,425	1,425	1,425	1,425	1,485	1,485	1,485
%	0.0	5.1	0.0	0.0	2.4	1.6	1.9	8.4	0.0	0.0	0.0	4.2	0.0	0.0
Ctd grwd No. 4 (78/80) 50-lb	1,110	1,170	1,170	1,170	1,200	1,220	1,220	1,300	1,300	1,300	1,300	1,370	1,370	1,370
%	0.0	5.4	0.0	0.0	2.6	1.7	0.0	6.6	0.0	0.0	0.0	5.4	0.0	0.0
No. 5 34-lb rolls	1,145	1,205	1,205	1,205	1,235	1,255	1,255	1,335	1,335	1,335	1,335	1,405	1,405	1,405
%	0.0	5.2	0.0	0.0	2.5	1.6	0.0	6.4	0.0	0.0	0.0	5.2	0.0	0.0
No. 5 40-lb rolls	1,010	1,070	1,070	1,070	1,100	1,120	1,120	1,200	1,200	1,200	1,200	1,270	1,270	1,270
%	0.0	5.9	0.0	0.0	2.8	1.8	0.0	7.1	0.0	0.0	0.0	5.8	0.0	0.0
<b>Uncoated mechanical papers</b>														
Supercalendered paper 35-lb (SC-A)	940	940	940	1,000	1,000	1,050	1,060	1,060	1,140	1,140	1,140	1,140	1,140	1,140
%	6.8	0.0	0.0	6.4	0.0	5.0	1.0	0.0	7.5	0.0	0.0	0.0	0.0	0.0
Offset substitute 45-lb 83/84 bright	1,023	1,023	1,023	1,073	1,073	1,123	1,123	1,173	1,173	1,173	1,273	1,273	1,273	1,273
%	0.0	0.0	0.0	4.9	0.0	4.7	0.0	4.5	0.0	0.0	8.5	0.0	0.0	0.0

# ANNUAL SHIPMENTS & CAPACITY COMPARISON



Coated Freesheet			Coated Mechanical			Uncoated Freesheet			Uncoated Mechanical						
SADJ Shipments	Capacity	N.A. CFR SADJ Ship/Cap	SADJ Shipments	Capacity	N.A. CM SADJ Ship/Cap	SADJ Shipments	Capacity	N.A. UFR SADJ Ship/Cap	SADJ Shipments	Capacity	N.A. UM SADJ Ship/Cap				
Jan-20	240.0	248.3	97%	Jan-20	129.5	167.0	78%	Jan-20	599.0	668.0	90%	Jan-20	214.2	241.7	89%
Feb-20	222.5	248.3	90%	Feb-20	123.3	167.0	74%	Feb-20	612.0	668.0	92%	Feb-20	188.0	241.7	78%
Mar-20	219.8	248.3	89%	Mar-20	140.8	167.0	84%	Mar-20	624.0	668.0	93%	Mar-20	206.2	241.7	85%
Apr-20	148.2	244.3	61%	Apr-20	102.9	153.0	67%	Apr-20	424.0	652.0	65%	Apr-20	152.8	241.7	63%
May-20	106.7	244.3	44%	May-20	77.1	153.0	50%	May-20	395.0	652.0	61%	May-20	127.4	241.7	53%
Jun-20	128.2	244.3	52%	Jun-20	85.3	153.0	56%	Jun-20	455.0	652.0	70%	Jun-20	122.5	241.7	51%
Jul-20	160.1	208.3	77%	Jul-20	79.8	138.7	58%	Jul-20	505.0	617.0	82%	Jul-20	139.5	241.7	58%
Aug-20	167.1	208.3	80%	Aug-20	93.5	138.7	67%	Aug-20	493.0	617.0	80%	Aug-20	145.0	241.7	60%
Sep-20	186.2	208.3	89%	Sep-20	112.4	138.3	81%	Sep-20	540.0	617.0	88%	Sep-20	156.3	226.7	69%
Oct-20	196.4	190.7	103%	Oct-20	103.9	132.3	79%	Oct-20	527.0	594.7	89%	Oct-20	156.0	226.7	69%
Nov-20	190.7	190.7	100%	Nov-20	97.5	132.3	74%	Nov-20	510.0	594.7	86%	Nov-20	158.8	226.7	70%
Dec-20	195.0	190.7	102%	Dec-20	93.1	132.3	70%	Dec-20	510.0	594.7	86%	Dec-20	165.0	226.7	73%
<b>YTD</b>	<b>2,160.9</b>	<b>2,674.8</b>	<b>81%</b>	<b>YTD</b>	<b>1,239.1</b>	<b>1,772.6</b>	<b>70%</b>	<b>YTD</b>	<b>6,194.0</b>	<b>7,595.1</b>	<b>82%</b>	<b>YTD</b>	<b>1,931.7</b>	<b>2,840.4</b>	<b>68%</b>
Jan-21	167.7	180.0	93%	Jan-21	82.7	105.3	79%	Jan-21	500.0	574.7	87%	Jan-21	165.7	203.3	82%
Feb-21	168.7	180.0	94%	Feb-21	94.1	105.3	89%	Feb-21	475.0	574.7	83%	Feb-21	167.1	203.3	82%
Mar-21	199.9	180.0	111%	Mar-21	106.0	105.3	101%	Mar-21	543.0	574.7	94%	Mar-21	199.6	203.3	98%
Apr-21	185.0	181.7	102%	Apr-21	98.5	105.3	94%	Apr-21	509.0	548.7	93%	Apr-21	162.0	194.0	84%
May-21	188.3	181.7	104%	May-21	105.3	105.3	100%	May-21	504.0	548.7	92%	May-21	171.0	194.0	88%
Jun-21	200.6	181.7	110%	Jun-21	112.1	105.3	106%	Jun-21	546.0	548.7	100%	Jun-21	164.0	194.0	85%
Jul-21	187.4	181.7	103%	Jul-21	92.9	107.3	87%	Jul-21	528.0	548.7	96%	Jul-21	160.8	190.7	84%
Aug-21	183.1	181.7	101%	Aug-21	100.9	107.3	94%	Aug-21	538.0	548.7	98%	Aug-21	164.2	190.7	86%
Sep-21	164.4	181.7	90%	Sep-21	101.8	107.3	95%	Sep-21	489.0	548.7	89%	Sep-21	171.1	190.7	90%
Oct-21	159.1	183.3	87%	Oct-21	92.0	93.3	99%	Oct-21	520.0	548.7	95%	Oct-21	167.3	190.7	88%
Nov-21	166.6	183.3	91%	Nov-21	89.6	93.3	96%	Nov-21	504.0	548.7	92%	Nov-21	171.0	190.7	90%
Dec-21	184.7	183.3	101%	Dec-21	89.8	93.3	96%	Dec-21	501.0	548.7	91%	Dec-21	170.5	190.7	89%
<b>YTD</b>	<b>2,155.5</b>	<b>2,180.1</b>	<b>99%</b>	<b>YTD</b>	<b>1,165.7</b>	<b>1,233.6</b>	<b>94%</b>	<b>YTD</b>	<b>6,157.0</b>	<b>6,662.4</b>	<b>92%</b>	<b>YTD</b>	<b>2,034.3</b>	<b>2,336.1</b>	<b>87%</b>
Jan-22	173.9	183.3	95%	Jan-22	88.4	92.0	96%	Jan-22	487.0	538.3	90%	Jan-22	172.8	195.0	89%
Feb-22	176.5	183.3	96%	Feb-22	82.4	92.0	90%	Feb-22	588.0	538.3	109%	Feb-22	176.7	195.0	91%
Mar-22	197.9	183.3	108%	Mar-22	86.4	92.0	94%	Mar-22	526.0	538.3	98%	Mar-22	200.9	195.0	103%
Apr-22	196.5	188.3	104%	Apr-22	89.5	92.0	97%	Apr-22	509.0	535.0	95%	Apr-22	182.0	201.0	91%
May-22	201.4	188.3	107%	May-22	93.0	92.0	101%	May-22	520.0	535.0	97%	May-22	196.5	201.0	98%
Jun-22	195.7	188.3	104%	Jun-22	90.0	92.0	98%	Jun-22	511.0	535.0	96%	Jun-22	195.2	201.0	97%
Jul-22	193.6	188.3	103%	Jul-22	86.3	90.0	96%	Jul-22	519.0	531.7	98%	Jul-22	183.8	201.0	91%
Aug-22	167.1	188.3	89%	Aug-22	82.1	90.0	91%	Aug-22	507.0	531.7	95%	Aug-22	179.9	201.0	90%
Sep-22	168.7	188.3	90%	Sep-22	80.9	90.0	90%	Sep-22	513.0	531.7	96%	Sep-22	176.8	201.0	88%
Oct-22	162.4	186.7	87%	Oct-22	79.9	90.0	89%	Oct-22	493.0	531.7	93%	Oct-22	174.0	201.0	87%

# SIGNIFICANT COATED CAPACITY CHANGES SINCE 2011



Coated Groundwood					
Company	Location	Annual Net Change (Short Tons)	Effective Date	Segment	Comments
NewPage	Stevens Point, WI	(247,000)	Feb-11	CGW	Whiting Mill Closed
Holmen	Madrid, Spain	(187,000)	Mar-11	CGW	Idled PM61
Oji	Fuji, Japan	(71,500)	Apr-11	CGW	Shut PM1
Rainbow Papers	Mehsana, Gujarat, India	134,500	Q3-11	CGW	2nd hand CGW machine
Sun Paper	Yanzhou Mill, China	385,000	Q3-11	CGW	new PM24
Verso	Bucksport, ME	(90,000)	Oct-11	CGW	Shut down PM2
Myllykoski/UPM	Anjalankoski, Kouvola, Finland	(232,000)	Dec-11	CGW	Mill Closure
Myllykoski/UPM	Albbruck, Germany	(353,000)	Jan-12	CGW	Mill Closure
Norske Skog	Honefoss, Norway	(154,000)	Mar-12	CGW	Follum Mill Closure
Resolute	Catawba, SC	(125,000)	Jun-12	CGW	Indefinite Shut - PM1
Verso	Sartell, MN	(180,000)	Aug-12	CGW	Mill Closure
Guangxi Tianyi	Fangchenggang, Guangxi, China	165,000	2013	CGW	2nd hand CGW machine
Tan Mai	Kontum, Vietnam	220,000	2013	CGW	CGW
UPM	Stracel, France	(297,000)	Jan-13	CGW	ceased production of LWC and MFC papers
Investlesprom Kama P&P	Krasnokamsk, Russia	95,000	Mar-13	CGW	restart PM3
Norske Skog	Walsum, Germany	(248,000)	Dec-13	CGW	Shut PM4
Stora Enso	Corbehem, France	(364,000)	Jan-14	CGW	Mill Closure
NewPage	Rumford, ME	(22,000)	Feb-14	CGW	indefinite Shut - PM12
Stora Enso	Veitsiluoto, Finland	(209,000)	Mar-14	CGW	Shut PM1
Norske Skog	Tasmania, Australia	154,000	Apr-14	CGW	PM2 Converted from Newsprint to CGW
FutureMark	Alsip, IL	(124,000)	Sep-14	CGW	Mill Indefinitely Idled
Verso	Bucksport, ME	(350,000)	Dec-14	CGW	Mill Closure
Metsa-Board	Husum, Sweden	(132,000)	2015	CGW	PM8 Shift to packaging grades
Catalyst	Rumford, ME	(47,000)	Sep-15	CGW	PM12 Indefinitely Idled
Verso	Jay, ME	(150,000)	Q4-15	CGW	PM2 Shut down
Burgo	Duino Mill, Italy	(165,000)	Dec-15	CGW	Permanent closure, PM2
Kotkamills	Kotka, Finland	(198,000)	Jan-16	CGW	Permanent closure, PM2
Catalyst	Rumford, ME	41,000	May-16	CGW	PM12 restart - coated and uncoated
Norske Skog	Walsum, Germany	(225,000)	May-16	CGW	Permanent closure, PM10
Resolute	Catawba, SC	(190,000)	Jul-17	CGW	PM2 Shut down
UPM	Kaukas, Finland	(248,000)	Q1-17	CGW	Shut PM2
Verso	Jay, ME	(150,000)	Q1-17	CGW	Shut PM3 (Permanent in Q2-17)
UPM	Grand Rapids, MN	(128,000)	Q1-18	CGW	Shut PM5
Nippon Paper	Fuji, Japan	(54,000)	Jun-19	CGW	Shut PM 11
ND Paper USA	Biron, WI	(140,000)	2019	CGW	Convert PM 25 to Containerboard
Burgo	Verzuolo, Italy	(440,000)	Nov-19	CGW	Convert PM 9
Sappi	Lanaken, Mill Belgium Germany	(220,000)	2019	CGW	convert to CWF
UPM	Plattling, Germany	(155,000)	Q4-19	CGW	shut PM 10
Oji Paper Co Planned	Ebetsu, Japan	(66,000)	H-1 2020	CGW	Shut PM #1 & PM #4
New Indy	Catawba, SC	(350,000)	Q3-2020	CGW	convert to containerboard
UPM	Kaipola, Finland	(330,000)	Q4-2020	CGW	Shut mill, 300K CGW + 450K Newsprint
ND Paper USA	Rumford, ME	(115,000)	Q4-2020	CGW	convert R15 to linerboard
SCA	Ortvikens, Sweden	(561,000)	Q1-2021	CGW	convert mill to pulp only - +255K UGW
Stora Enso	Veitsiluoto, Finland	(319,000)	Q3-2021	CGW	ceased production
Pactiv Evergreen	Pine Bluff, Arkansas	(184,000)	Q3-2021	CGW	Ceased production of printing papers
<b>net change</b>		<b>(6,626,000)</b>			

Coated Free					
Company	Location	Annual Net Change (Short Tons)	Effective Date	Segment	Comments
Sappi	Biberist, Switzerland	(479,000)	Q2-11	CFS	Ceased CFS production at mill
M-Real	Aanekoski Finland	(220,000)	Dec-11	CFS	Closed PM2
Stora Enso	Uetersen, Germany	(154,000)	2012	CFS	gradual shift to specialty products
M-Real	Husum, Sweden	60,000	Q1-12	CFS	Transfer from Aanekoski
Smart Papers	Hamilton, OH	(42,000)	Feb-12	CFS	Shut last PM at mill
Burgo	Avezzano, Italy	(132,000)	Jul-12	CFS	Shut PM1
Arjo wiggins	Odense, Denmark	(120,000)	Dec-12	CFS	Mill Closure
Lecta	Condat le Lardin, France	(99,000)	Jul-13	CFS	closed PM6
International Paper	Courtland, AL	(116,000)	Q4-13	CFS	Mill closure complete Q1-14
Sappi	Alfeld, Germany	(165,000)	Q4-13	CFS	shifted PM2 to specialty products
Ilum Group	Koryazhma, Russia	77,000	Q4-13	CFS	New PM7 and coater
Lecta	Zaragoza & Motril, Spain	(40,000)	2014	CFS	gradual shift to specialty products
Burgo	Avezzano, Italy	(165,000)	Jan-14	CFS	shut PM2
NewPage	Rumford, ME	(45,000)	Feb-14	CFS	Indefinitely idled PM12
Sappi	Nijmegen, Netherlands	(265,000)	Jun-14	CFS	Mill ceased CFS production, sold to AIAC to produce specialty products
Paper Excellence (Scheufelen)	Lenningen, Germany	(176,000)	Jul-14	CFS	Idle PM6
FutureMark	Alsip, IL	(35,000)	Sep-14	CFS	Mill indefinitely idled
Sappi	Stranger, South Africa	(88,000)	Dec-14	CFS	transition to UFS products
Arjo wiggins	Wizernes, France	(187,000)	2015	CFS	mill closure
Metsa-Board	Husum, Sweden	(66,000)	2015	CFS	PMB shifting to packaging grades
Lecta	Zaragoza & Motril, Spain	(66,000)	2015	CFS	gradual shift to specialty products
APP Gold East	Jiangsu, China	(198,000)	2015	CFS	PM closures
Catalyst	Rumford, ME	45,000	Jan-15	CFS	PM12 restarted
Catalyst	Rumford, ME	(65,000)	Sep-15	CFS	PM12 indefinitely shut in Sep after being idled temporarily on 5/20/15
Lecta	Zaragoza & Motril, Spain	(66,000)	2016	CFS	gradual shift to specialty products
Verso	Wickliffe, KY	(250,000)	Apr-16	CFS	Mill closure
Catalyst	Rumford, ME	58,000	May-16	CFS/UPS	PM12 restarted - to make both CFS & UFS products
Moorim Paper	Jinju, South Korea	(114,000)	Q2-16	CFS	PM closures
Hansol Artone	Osan, South Korea	(103,000)	Q2-16	CFS	PM closures
Stora Enso	Suzhou Mill, China	(265,000)	Q4-16	CFS	PM closures
Verso	Jay, ME	(50,000)	Q1-17	CFS	Shut PM6 (Permanent in Q2-17)
Sappi	Lanaken, Mill Belgium Germany	350,000	Jun-19	CFS	PMB to transition to CFS - restarted 6/2019 after rebuild
Appleton Coated	Appleton, WI USA	(280,000)	Oct-17	CFS	Mill Shut - ran out of SS
West Linn paper Co	West Linn, OR USA	(270,000)	Oct-17	CFS	Mill shut - non integrated
Sappi	Somerset, ME USA	(198,000)	Q1-18	CFS	Rebuild PM1 - add packaging capabilities
Arjo wiggins	Besse-sur-Braye	(220,000)	2018	CFS	mill shut
Scheufelen	Germany	(132,000)	2018	CFS	mill shut
Lecta	Condat le Lardin, France	(253,000)	Apr-19	CFS	PMB Temporary Shut
Verso	Luke, MD	(320,000)	Jun-19	CFS	Mill Shut - 450M total capacity
Daio	Mishima Mill	(165,000)	Oct-19	CFS	PMN7 - convert to kraft paper production
Hokuetsu	Niigata Mill	(177,100)	Jan-20	CFS	Convert PM6 to Corrugated Base Paper
Oji Paper Co	Tomioaki, Japan	(143,000)	Q4-2019	CFS	PM #9 shut
Sappi	Stockstadt, Germany	(264,000)	Sep-20	CFS	PM2 Shut
Stora Enso	Oulu, Finland	(1,210,000)	Q3-2020	CFS	Shut CFS PM6, Convert CFS PM7 to Kraftliner
Verso	Wisconsin Rapids, WI	(540,000)	Jul-20	CFS	Shut PM 14 & PM 16
ND Paper USA	Rumford, ME	(115,000)	Q4-2020	CFS	convert R15 to linerboard
<b>net change</b>		<b>(7,458,100)</b>			

# COATED AND SUPER CAL WEB GRADE AND BW RATIONALIZATION



AF&PA Classification GE Brightness/Tappi T452	Grade #1 Freesheet ≥ 91.0	Grade #2 Freesheet 87.0 to 90.9	Grade #2 Groundwood ≥ 87.0	Grade #3 Freesheet 82.0 to 86.9	Grade #3 Groundwood 82.0 to 86.9	Grade #4 Freesheet ≤ 81.9	Grade #4 Groundwood 75.0 to 81.9	Grade #5 Groundwood ≤ 74.9	SCA, SCB, SNC, MFC, LWJ
<b>PAPER MILLS</b>									
<b>Burgo</b>		Isoro Plus (95 ISO) (S*) R4 Glass (95 ISO) (M) (S*) (RG) Respecta Web (95 ISO) (M) (S*)	Uno Bright (90-94 ISO) (S*)		Uno Prime (88-89 ISO) (M) (S*)			Uno Web (71-73 ISO) (RG)	
<b>Catalyst</b>					Advance (85-87) (87 M) Ascent (82-84) (M 83) (S 83) * available as Sage brand		Pacificote (79-80) * available as Sage brand	Electracote (71-73) * available as Sage brand	
<b>Irving Paper</b>									Opulence SCA++ (74-75) (RG) Radiance SCA++ (70) (RG) Irving SCA (68) (RG) Ultrasmooth SCB (65) (FG)
<b>Kruger Paper</b>					KoKote (80) (S*) (pcw)		KruKote (76) (S*) (pcw)	KruKote (76-72) (S*) (HB-73)	
<b>ND Paper</b>		Orion (88) (S*) (M) (pcw)		Oxford C1S (85) (HB 88)				Consoweb (70-73) (S*) (73) (RG 71-73) (pcw) Consoweb HB (70-73) (pcw)	
<b>Norske Skog (NorCell)</b>			Norcelo Trend H (92-95 ISO) Norcelo Top H (92-93 ISO)		Norcelo Super H (85-87 ISO) Norcelo Silk H (86-88 ISO)			Norcelo H (75-78 ISO) Norcelo Soft H (76 ISO)	NorSC Polar (75-80 ISO) (RG) NorSC Line (69 ISO) (RG) NorSC Value (85 ISO) (RG)
<b>Port Hawkesbury</b>									Artisan SCA++ (75-77) (80) (RG) Prominence Plus SCA+ (73-71) (FG) Prominence SCA (67-68) (FG)
<b>Rayonier Advanced Materials</b>		Kallina Web Coated Cover C1S / C2S (90)							
<b>Resolute Forest Products</b>									Resolute SCA++ (75 ISO) Resolute SCA+ (70-71 ISO) (RG) Resolute SCA (68 ISO) Resolute SCB (63 ISO) Resolute SNC (63 ISO) Resolute Select (75, 70, 65) Resolute Book (75, 70, 65, 60)
<b>Sappi</b>	McCoy (96) (M) (S) (V) Opus (92) (D) (S*) (M) (pcw) Opus PS (92) (D) (M) (pcw) Opus 37 (92) (D) (M)	Somerset (88) (M) (S*) (pcw)	Galerie Fine (92-89 ISO) (S*) (HB)	Flo Web (92-83) (M) (pcw)	Galerie Elite (85-87 ISO) (HB)			Galerie Lita (68-73 ISO) (HB)	
<b>Steinbels</b>							Charisma Brilliant Plus (81 ISO) Charisma Brilliant (79-80 ISO) Silk (#1) 5-85 (S*)		
<b>Stora Enso</b>	Lumi (98 ISO) (S)						StellaPress (87 ISO) (HB)		MagnaPress SCA++ (71-75 ISO) (RG) PubliPress SCA (67 ISO) (S*) (RG) EnvulPress SCB (66-67 ISO) (RG) PrimePress (80-81 ISO) (RG)
<b>Twin Rivers Paper Company</b>									Border Brite (85 ISO) (pcw) Bridge Opaque (80 ISO) (pcw) Bridge Supreme (82 ISO) (pcw) Frontier Opaque (80 ISO) (pcw) Frontier Supreme (82 ISO) (pcw) FroBrite (72 & 75 ISO) (pcw)
<b>UPM</b>	Finesse (EU 95) (S*) (M) (RG)		Star (EU 87-82) (RG EU 81) (M) Star Silk (EU 91-82) (RG EU 86) Valor Heatset (90-91)		Ultra Plus H (83-84) (EU 80-85) (RG EU 80-84) Ultra Plus Silk H (84) (EU 82-87) (RG EU 80-81)		Ultra H (80-81) (M) (RG) (pcw) Ultra Silk H (80-81) (RG) Cote Plus H (76) Cote Plus Silk (77) (EU 75) Valor Gravure (76)	Cote H (70-71) (EU 70-80) (RG 70-71) (RG EU 70-75)	Smart SCA++ (79-80) (RG 76-78) Impresso Plus SCA++ (80) (RG) Cut SCA+ (70-72) (RG 68-75) Max SCA (66-68) (RG) Impresso SCA (68) (RG) Eco SCB (65-74) (RG 63)
<b>Verso Corp.</b>		Starling Ultra Web (88-90) (D 90) (M 90) (pcw) AsterWeb Plus (88-90) (D 90) (M 90) (pcw) Starling Ultra Caliper (90) (M) (D)		Influence (86-88) (M) (S*) (RG 88) (pcw) AsterWeb (85-85) (S*) (pcw)	Liberty (82-84) (D 82) (M 83) (pcw)				
<b>WestRock</b>	Tango Coated Cover C1S (82)								
<b>Willamette Falls</b>	Capistrano (92) (D) (M) (pcw) Nature Plus (92) (D) (M)				Sonoma (86-88) (D) (M) (pcw) Nature Web (85-85) (D) (M)				

Evergreen Packaging Pine Bluff discontinued all TruSpec grades in Q4 2021.

ND Paper discontinuing Escanaba grade #4 in 2022. Also recently removed Sirius, Vision, Dependoweb & Capri grades from their line-up.

Catalyst discontinues all SC and Book grades at Powell River mill as well as Electracote Brite and Ascent “Gloss” finish in early 2022.

Stora Enso shuts down the Veitsiluoto mill and discontinues their NovaPress grade #3.

Verso (now Billerud) shut down the Duluth mill and discontinued their Voyager and Superior SC grades. They had also discontinued their Velocity and Balance grades in 2021.

Port Hawkesbury discontinued their Maritime SCB grade and eliminated some basis weights.

WFP discontinues Capistrano Dull finish.

Resolute Forest Products and UPM are both making SCA++ grades now.

New-Indy shut down the Catawba mill and discontinued all coated grades in 2020 for a full conversion to packaging grades.

\* Grades listed as Gloss finish. Options: (C) Cream, (D) Dull, (GFG) Glass Free Gloss, (LG) Low Gloss, (M) Matte, (S\*) Satin, (S) Silk, (Su) Suede, (SG) Soft Gloss, (V) Varnish, (RG) Gravure, (HB) High Bulk, (pcw) Recycled Fiber Available, (Italic) type indicates grade contains recycled fiber, FSC, PEFC, SFI available on select grades

# N.A. MILL MARKET SHARE – COATED FREESHEET



January 2017

COATED  
FREESHEET

Company	Volume (tons)	Market Share
Verso Corp.	1,770,000	46%
Sappi	1,240,000	32%
Appleton Coated	390,000	10%
West Linn Paper	250,000	7%
Catalyst	200,000	5%
<b>Total</b>	<b>3,850,000</b>	

January 2022

COATED  
FREESHEET

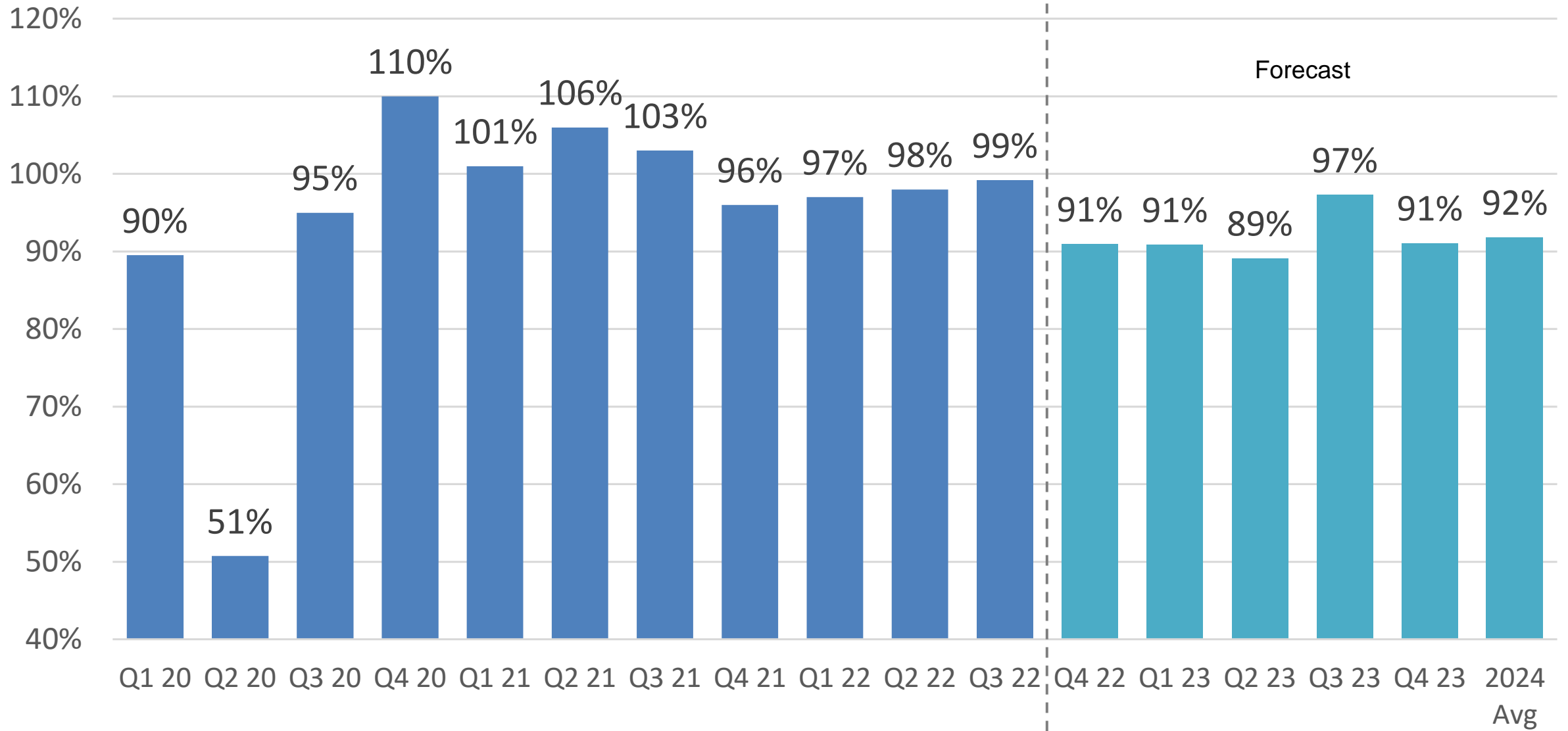
Company	Volume (tons)	Market Share
Sappi	1,000,000	49.6%
Verso	730,000	36.2%
Willamette Falls Paper	200,000	9.9%
ND Paper	85,000	4.2%
Catalyst	0	
Appleton Coated	0	
<b>Total</b>	<b>2,015,000 *</b>	

- Appleton closure (2017)
- West Linn closures (2017)
- Catalyst sale of Biron and Rumford mills to ND Paper (2018)
- Sappi Somerset PM1 SBS Conversion (2018-20)
- Verso Luke Mill Closure (2019)
- West Linn restarts as Willamette Falls Paper (August 2019)
- Verso Wisconsin Rapids Closure (2020)
- ND Paper Rumford R15 Conversion (2020)

48% less volume today!

\* The current volume produced is significantly less than reported. Sappi and Willamette Falls are transitioning some tons away from coated graphic papers to packaging and other grades.

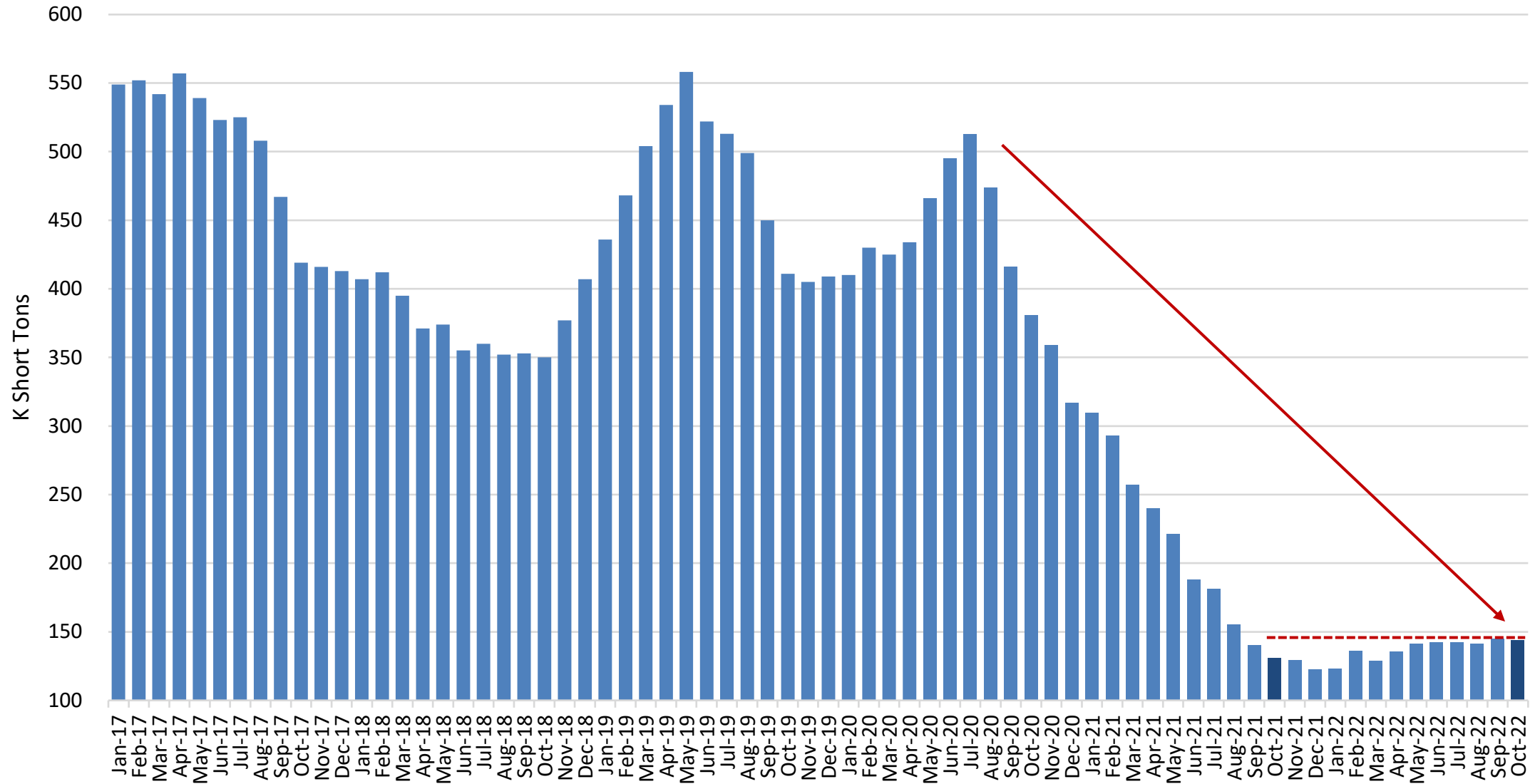
# U.S. COATED FREESHEET MILL OPERATING RATE FORECAST



# N.A. COATED FREESHEET MILL INVENTORY SIGNIFICANT REDUCTION



## NA CFS Mill Month-End Inventory



Source: PPC



# N.A. MILL MARKET SHARE – COATED GROUNDWOOD



January 2017

COATED  
GROUNDWOOD

Company	Volume (tons)	Market Share
Catalyst	860,000	32%
Resolute Forest Products	550,000	20%
Verso Corp.	465,000	17%
UPM	390,000	14%
Kruger	275,000	10%
Evergreen Packaging	180,000	7%
<b>Total</b>	<b>2,720,000</b>	<b>100%</b>

January 2022

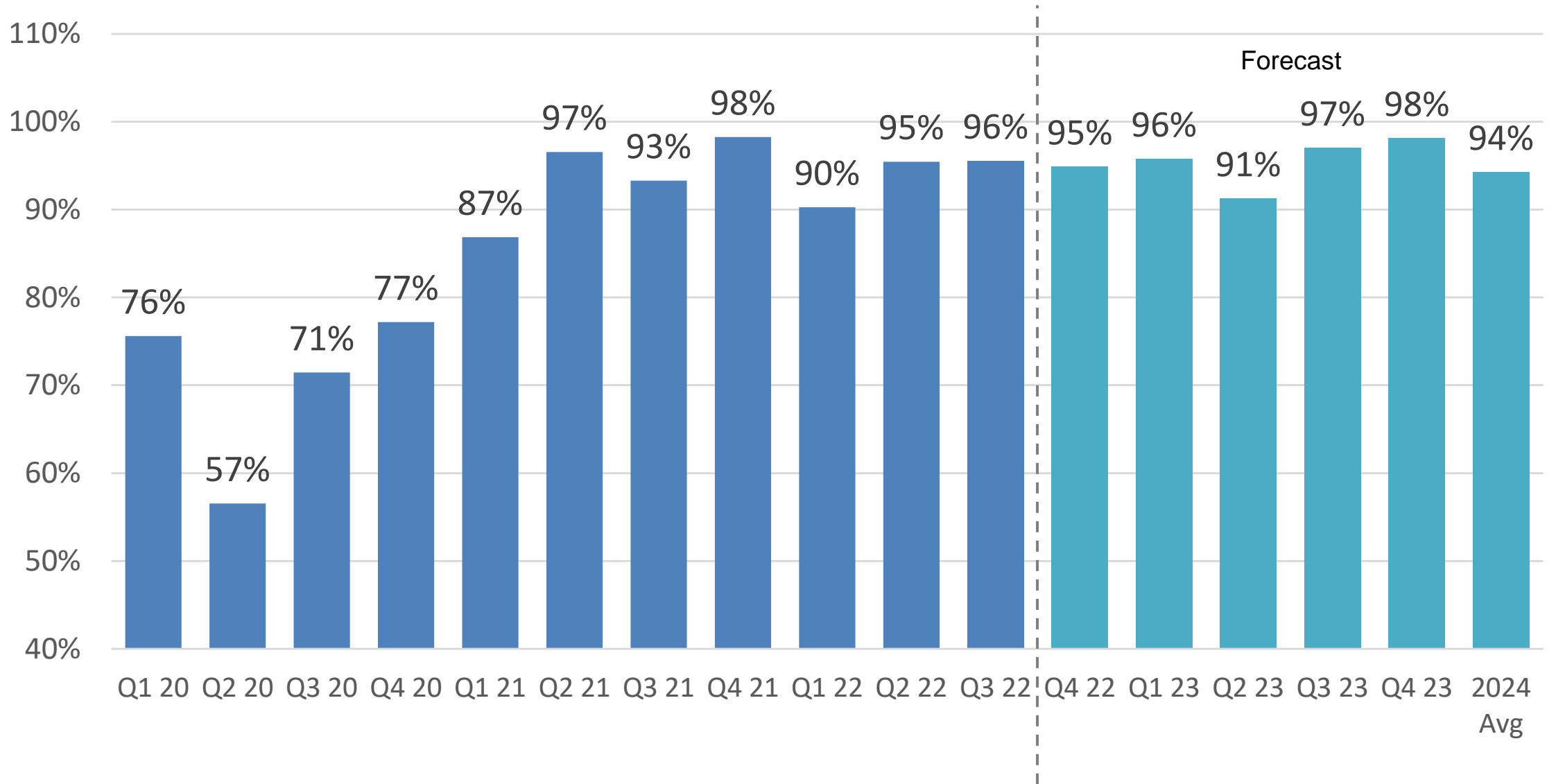
COATED  
GROUNDWOOD

Company	~ Volume (tons)	Market Share
<b>ND Paper</b>	<b>385,000</b>	<b>23.3%</b>
<b>Verso Corp.</b>	<b>315,000</b>	<b>19.1%</b>
Kruger	275,000	16.7%
UPM	265,000	16.1%
Catalyst (Paper Excellence)	231,000	14.0%
Evergreen Packaging	0	
Resolute Forest Products	0	
<b>Total</b>	<b>1,471,000</b>	<b>100%</b>

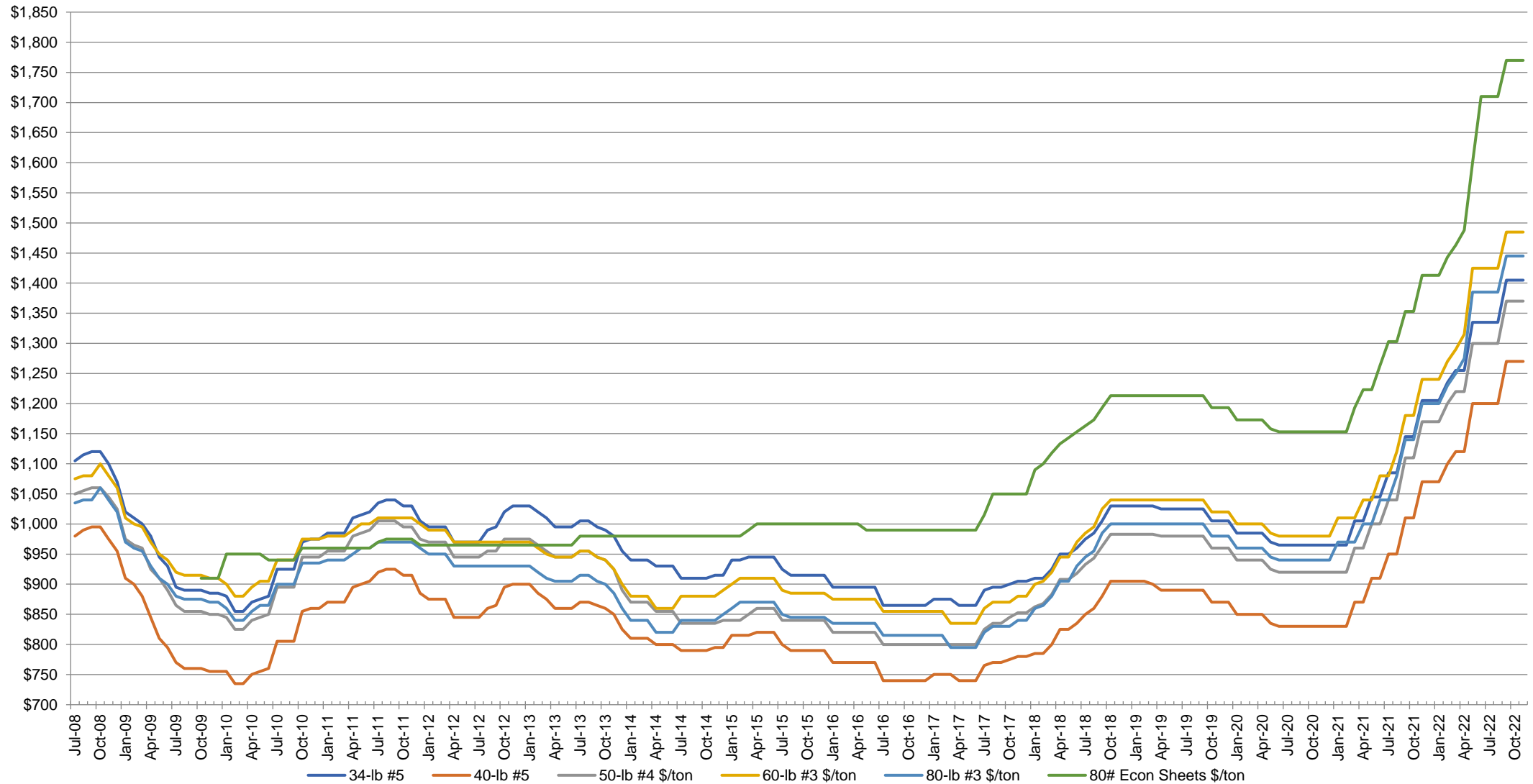
- Catalyst sale of Biron and Rumford mills to ND Paper (2018)
- UPM Blandin PM5 shutdown (2017)
- ND Paper Rumford R15 and Biron PM25 Conversions (2020)
- Resolute (New Indy Catawba Machine) Conversion (May 2020)
- Evergreen shut Pine Bluff mill (2021 Q4)
- **ND Paper will be converting 260,000 tons on Biron PM26 to packaging grades by the end of 2022. Their CGW volume will be 125,000 tons dropping them to the bottom of the list.**
- **Billerud (formerly Verso) has plans to convert two CGW machines at their Escanaba mill to packaging grades**

**\* 46% less volume from Jan 2017 to Jan 2022!**

# U.S. COATED GROUNDWOOD MILL OPERATING RATE FORECAST

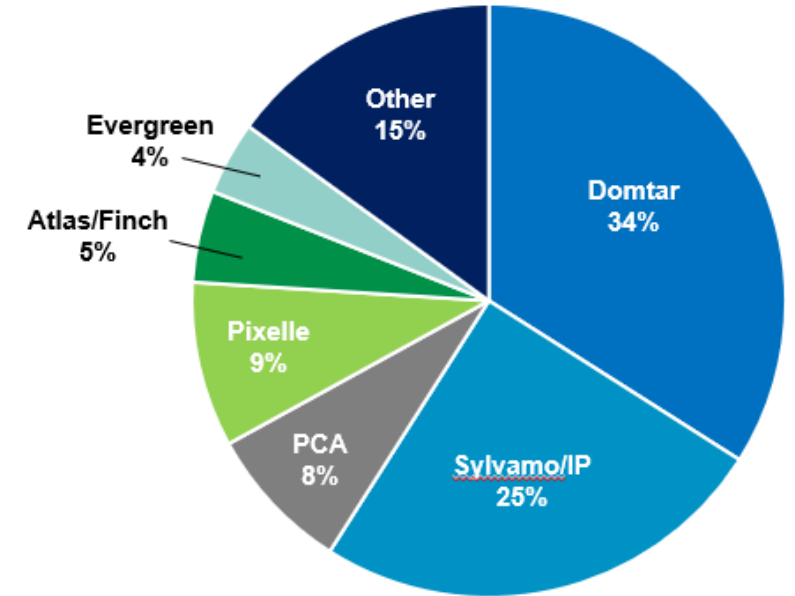
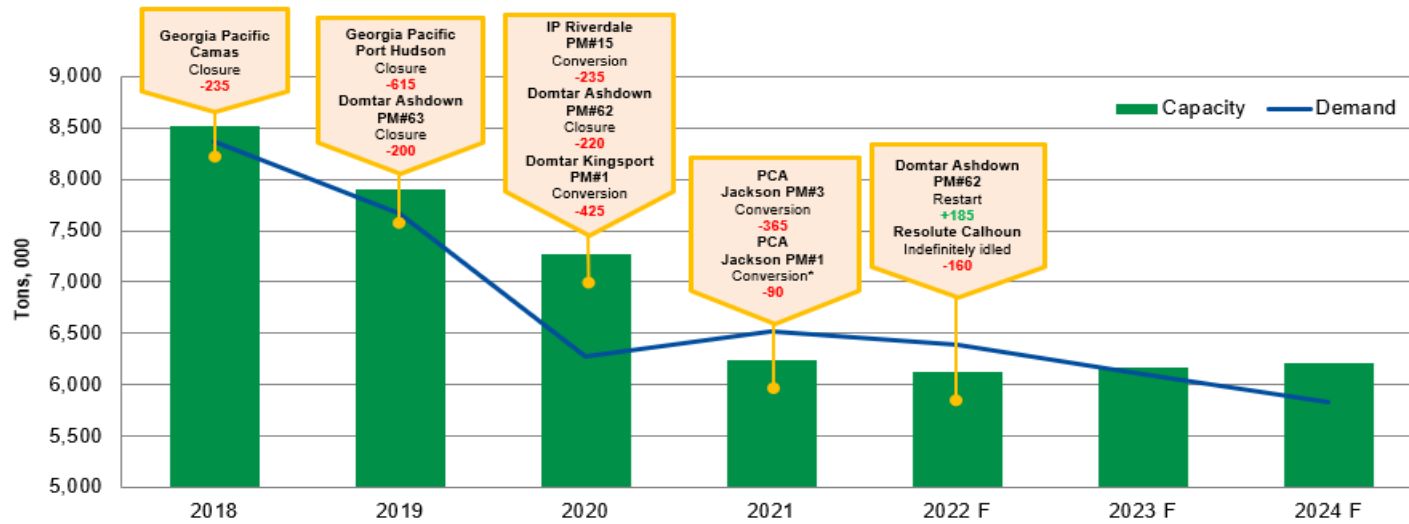


# HISTORICAL COATED MARKET PRICING (2012 – 2022)



Source: RISI Paper Trader Table A6 and Pulp & Paper Week Price Watch

# SIGNIFICANT UNCOATED FREESHEET CAPACITY REDUCTION



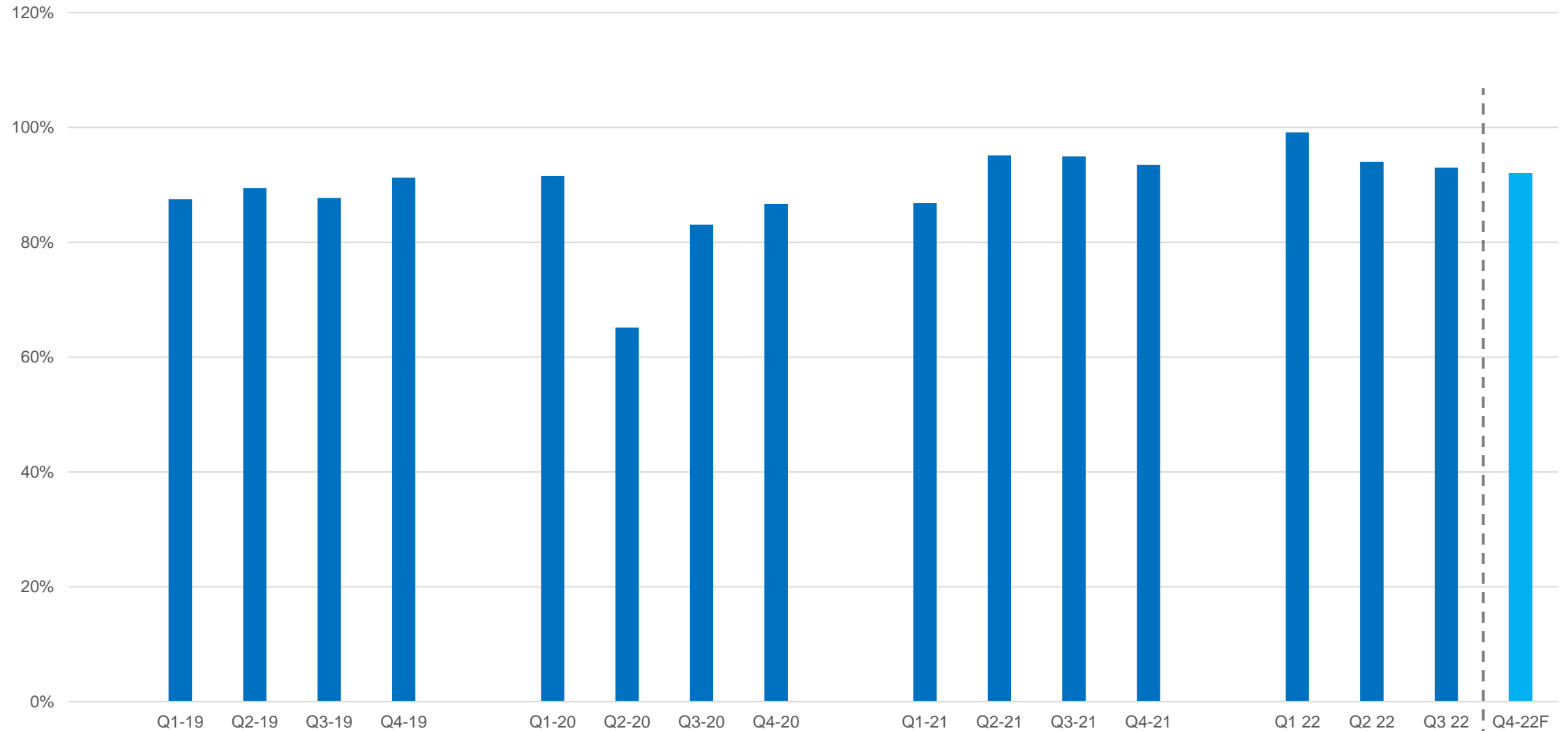
Date	Mill Name	Mill Location	Comments	Tons (,000)
Jan '18	Flambeau River	Park Falls, WI	Perm. shutdown PM# 3	-100
Jan '18	Appleton Coated (Midwest Paper)	Combined Locks, WI	Restart PM# 6 to produce CWF & UWF	50
May '18	Georgia Pacific	Camas, WA	Perm. shutdown PM# 20	-235
May '18	PCA	Wallula, WA	Conversion PM# 3 to Kraft Liner	-75
Mar '19	Georgia Pacific	Port Hudson, LA	Perm. shutdown PM# 3 & PM# 4	-615
June '19	Flambeau River	Park Falls, WI	Perm. shutdown PM# 1 & PM# 2	-65
Aug '19	Neenah Paper	Appleton, WI	PM# 5 Converted to AirLaid Non-Woven	-10
Aug '19	Willamette Falls	West Linn, OR	Restart PM #2	50
Oct '19	Domtar	Ashdown, AR	Perm. shutdown PM# 63	-200
Nov '19	Phoenix Paper	Wickliffe, KY	Restart PM# 21	170
Jan '20	International Paper	Riverdale, AL	Conv. of PM #15 to containerboard	-235

Date	Mill Name	Mill Location	Comments	Tons (,000)*
May '20	Neenah	Neenah, WI	Indefinitely Idled PM# 3	-18
Aug '20	Domtar	Ashdown, AR	PM #62 Closure	-220
Aug '20	Domtar	Kingsport, TN	Conversion of PM # 1 to containerboard	-425
Q1 '21	Domtar	Port Huron, MI	Perm. Closure	-30
Q1 '21	PCA	Jackson, AL	Conversion to Linerboard	-365
April '21	Appvion	Roaring Spring, PA	Mill to closed. Business sold to Pixelle Specialty Solutions	-120
April '21	Midwest Paper	Combined Locks, WI	Conversion to containerboard	-50
Q3 '21	PCA	Jackson, AL	Conversion of PM #1 to corrugated medium; retains UFS capability	-90
Jan '22	Domtar	Ashdown, AR	PM # 62 Restart UFS	185
Feb '22	Resolute	Calhoun, TN	Indefinitely Idled PM #4	-160

Company	# of Mills	# of Paper Machines
Domtar	8	14
Sylvamo/I.P.	2+2	7
PCA-Boise	2	3
Pixelle	2	7
Atlas/Finch	2	5
Evergreen	1	3

Source: RISI, PPPC, Domtar

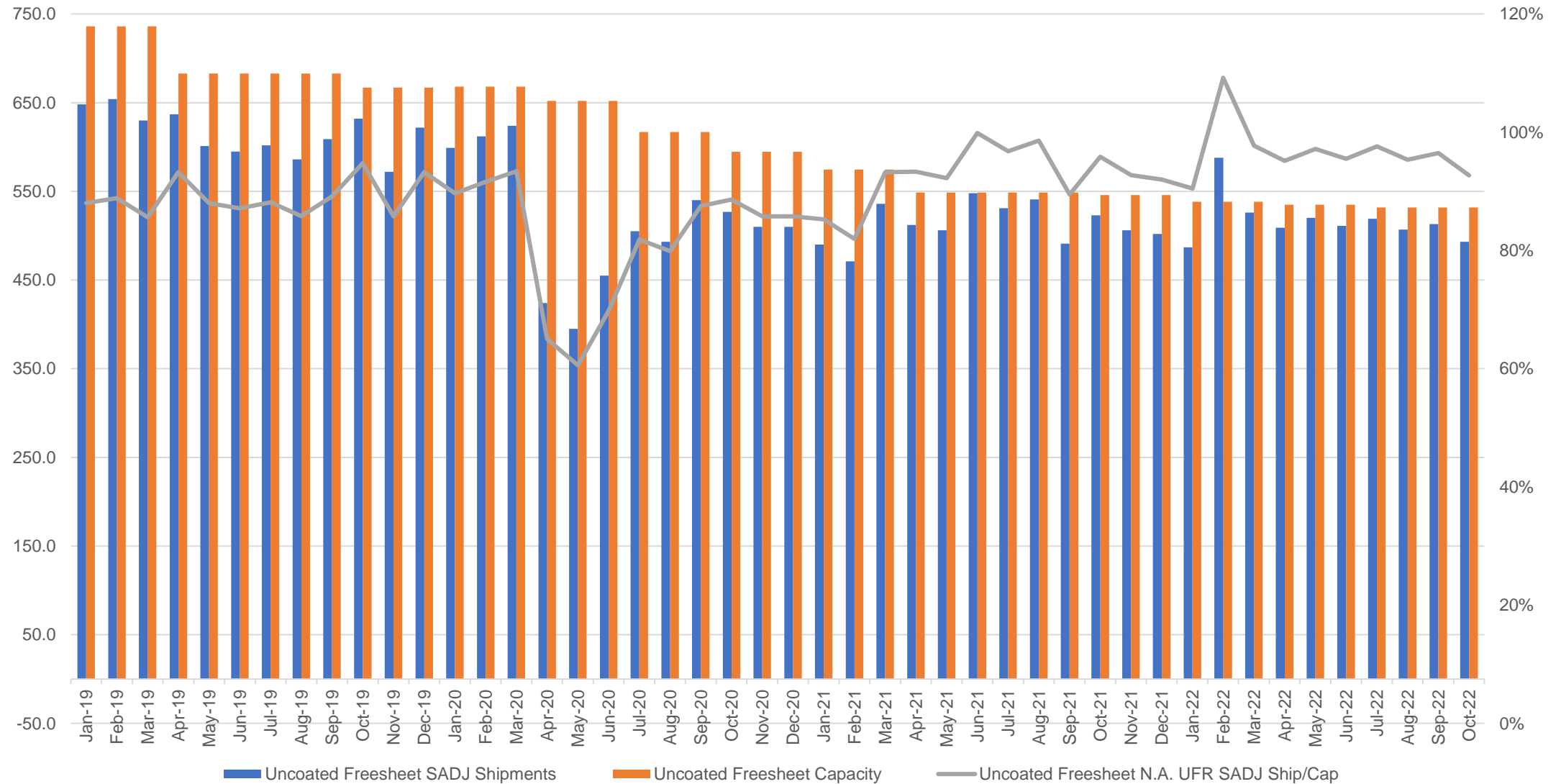
# U.S. UNCOATED FREESHEET MILL OPERATING RATE FORECAST



\* Includes Bristol and Cotton

Source: RISI PPPC

# N.A. UNCOATED FREESHEET MILL OPERATING RATES



Source: RISI

# UNCOATED FREESHEET HIGHLIGHTS



## N.A. DEMAND\* (TONS,00)

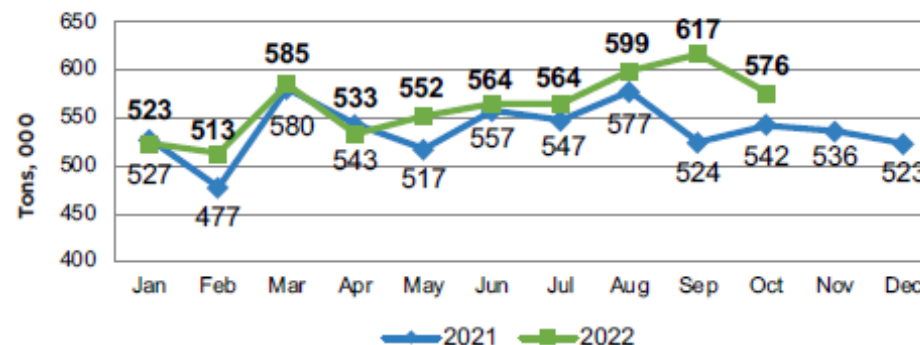
Overall UFS demand is up 4% YTD, higher than forecast. Continued to see strong month over month growth in most categories except forms and envelope.

Product Cat.	Oct-22	Oct-21	YOY Oct Var	YOY Oct Var %	YTD 2022	YTD 2021	YTD Oct Var	YTD Var %
Cut Size	234	213	21	10%	2,266	2,124	142	7%
Offset Opaques	199	173	26	15%	1,848	1,715	133	8%
Envelope	59	61	-2	-3%	597	604	-7	-1%
Forms	27	34	-7	-21%	278	314	-36	-11%
All Other	58	62	-4	-6%	637	633	4	1%
<b>Total UFS</b>	<b>576</b>	<b>542</b>	<b>34</b>	<b>6%</b>	<b>5,626</b>	<b>5,391</b>	<b>235</b>	<b>4%</b>

\*October Imports are estimated

## N.A. DEMAND\*

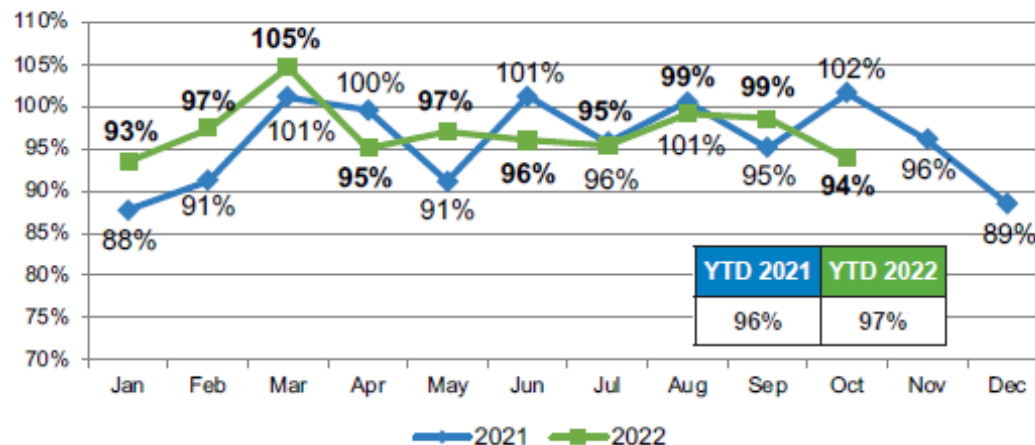
October demand at 576K tons is up 34K tons (+6%) compared to October 2021, but down 41K tons (-6%) from September. Still fourth highest monthly demand in 2022.



\*October Imports are estimated

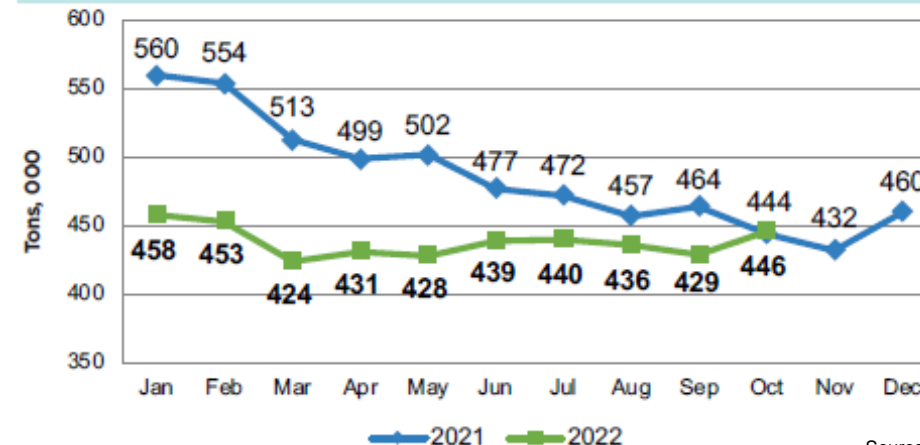
## N.A. MANUFACTURERS' SHIP TO CAPACITY RATIO

October ship to capacity at 94% is down 5% compared to September - lowest monthly STC since Jan '22. YTD 2022 ship to capacity remains strong at 97% and is up 1% compared to YTD 2021.



## N.A. UFS INVENTORY

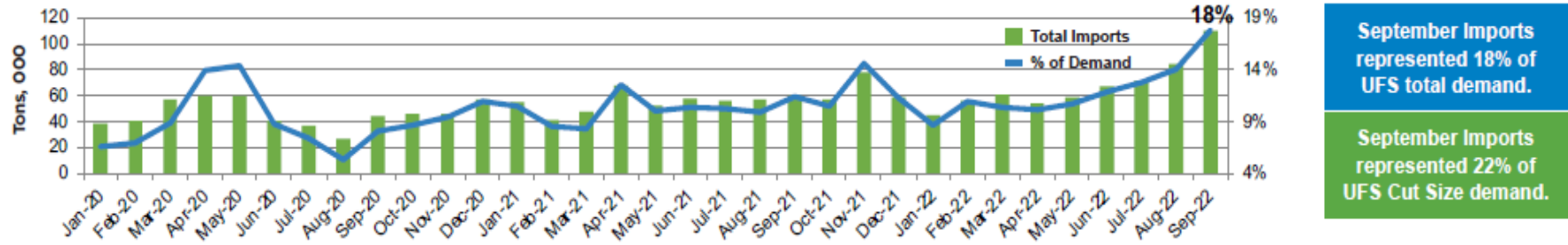
October N.A. Manufacturers' inventories increased by 17K tons over September and 22K tons over the lowest point in March. October inventories resulted in 29 days of supply equalling October 2021



# N.A. UNCOATED FREESHEET IMPORT TRENDS

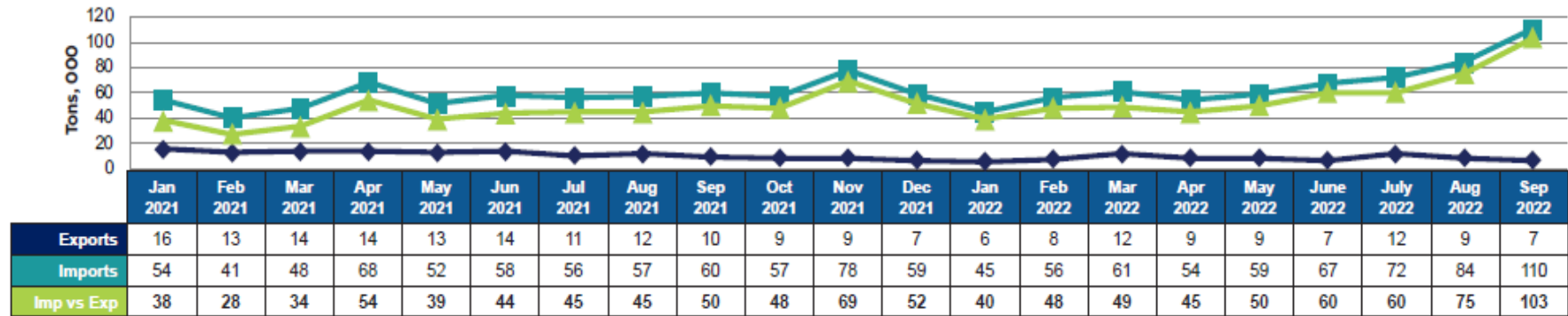


## IMPORTS VERSUS N.A. TOTAL DEMAND

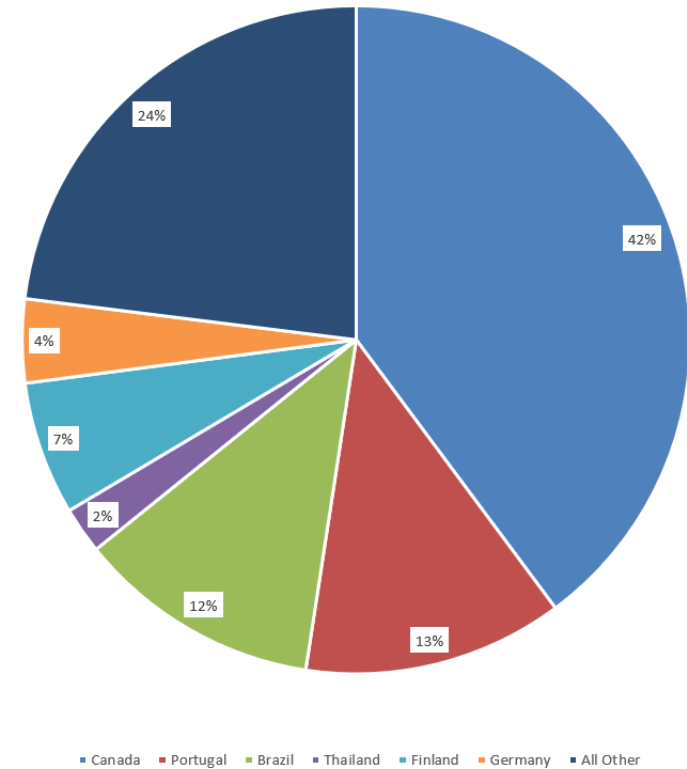


## N.A. TRADE BALANCE (TONS,000)

September trade balance was favorable to imports at 103K tons, the highest on record. September imports at 110K tons is the highest since May 2015.



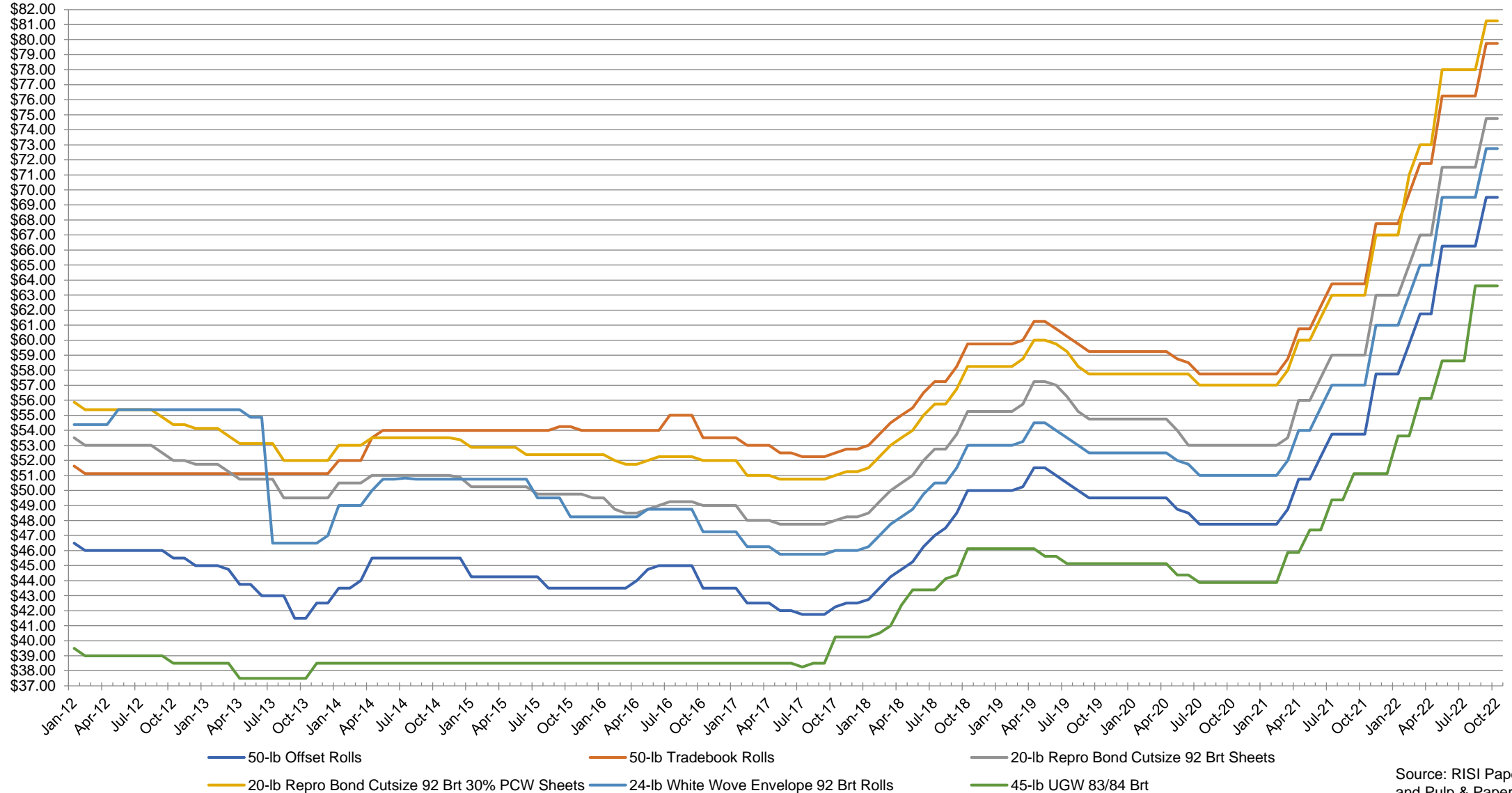
% of Total UFR Imports 2021



- October 2022 shipments at 497K tons is up 2K tons compared to October 2021
- Capacity is up 43K tons for the same period resulting in an 8% shipment to capacity drop

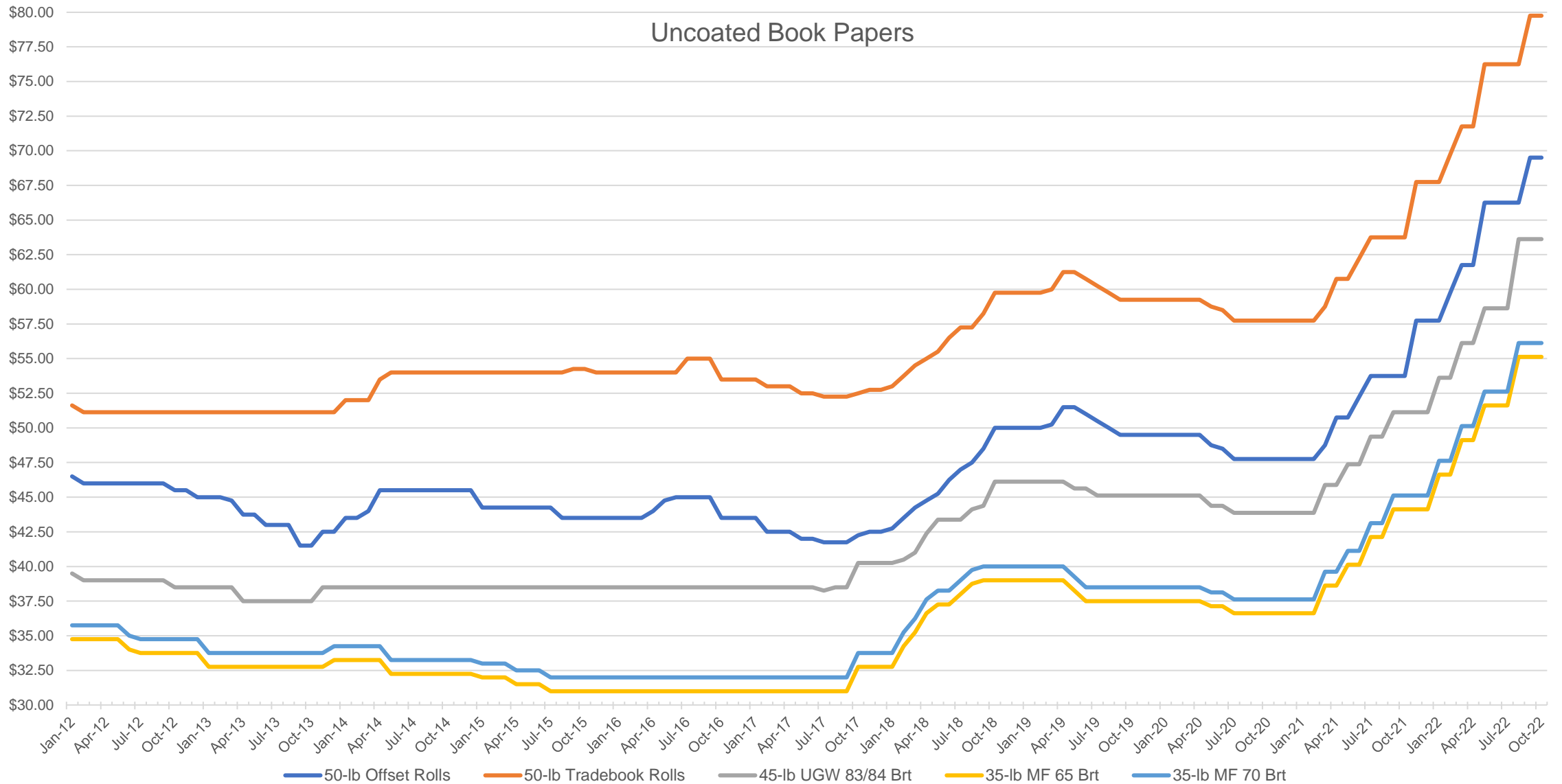


# HISTORICAL UNCOATED FREESHEET MARKET PRICING (2012 – 2022)



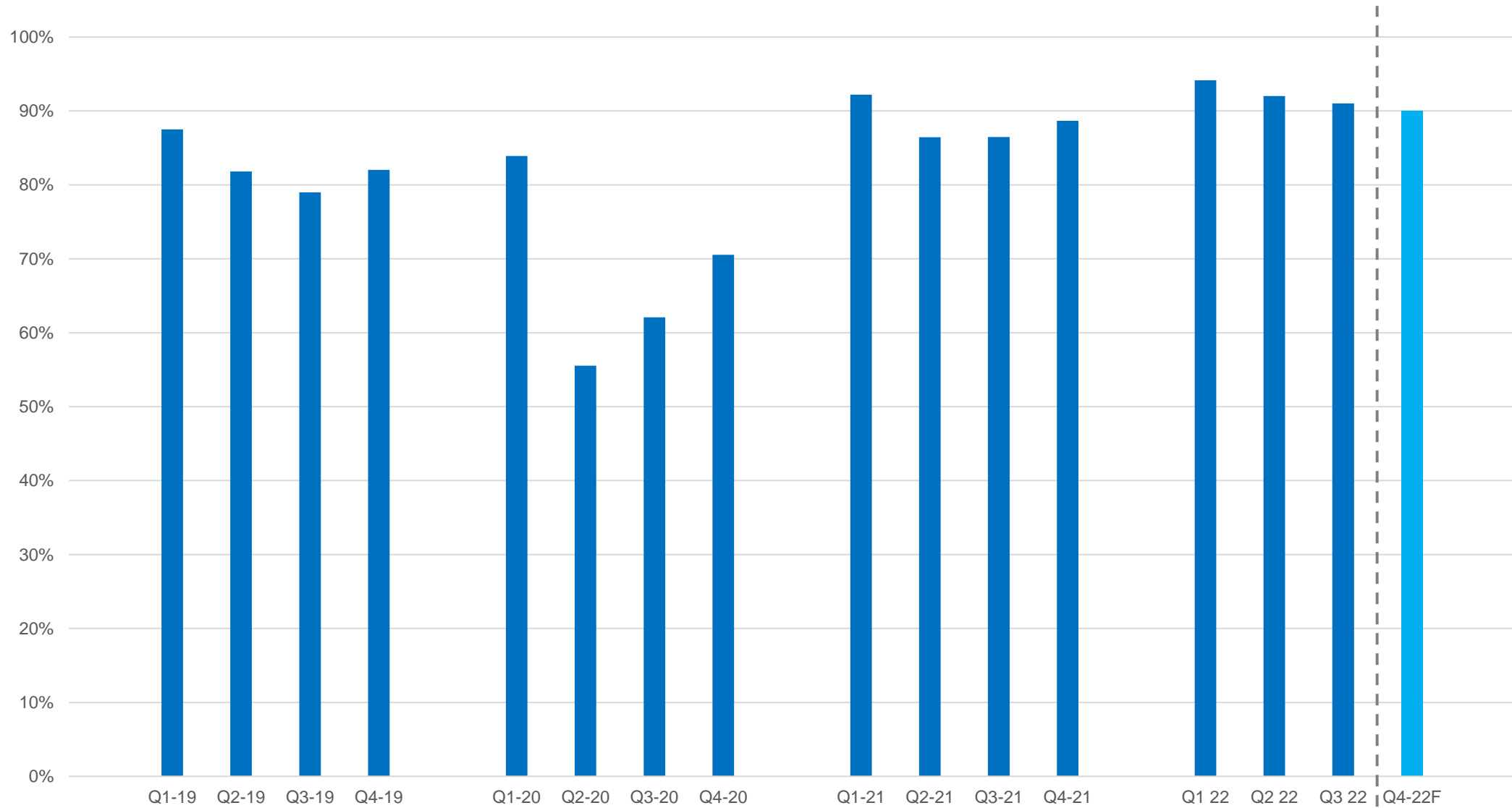
Source: RISI Paper Trader Table A6 and Pulp & Paper Week Price Watch

# HISTORICAL UNCOATED BOOK PAPERS MARKET PRICING (2012 – 2022)



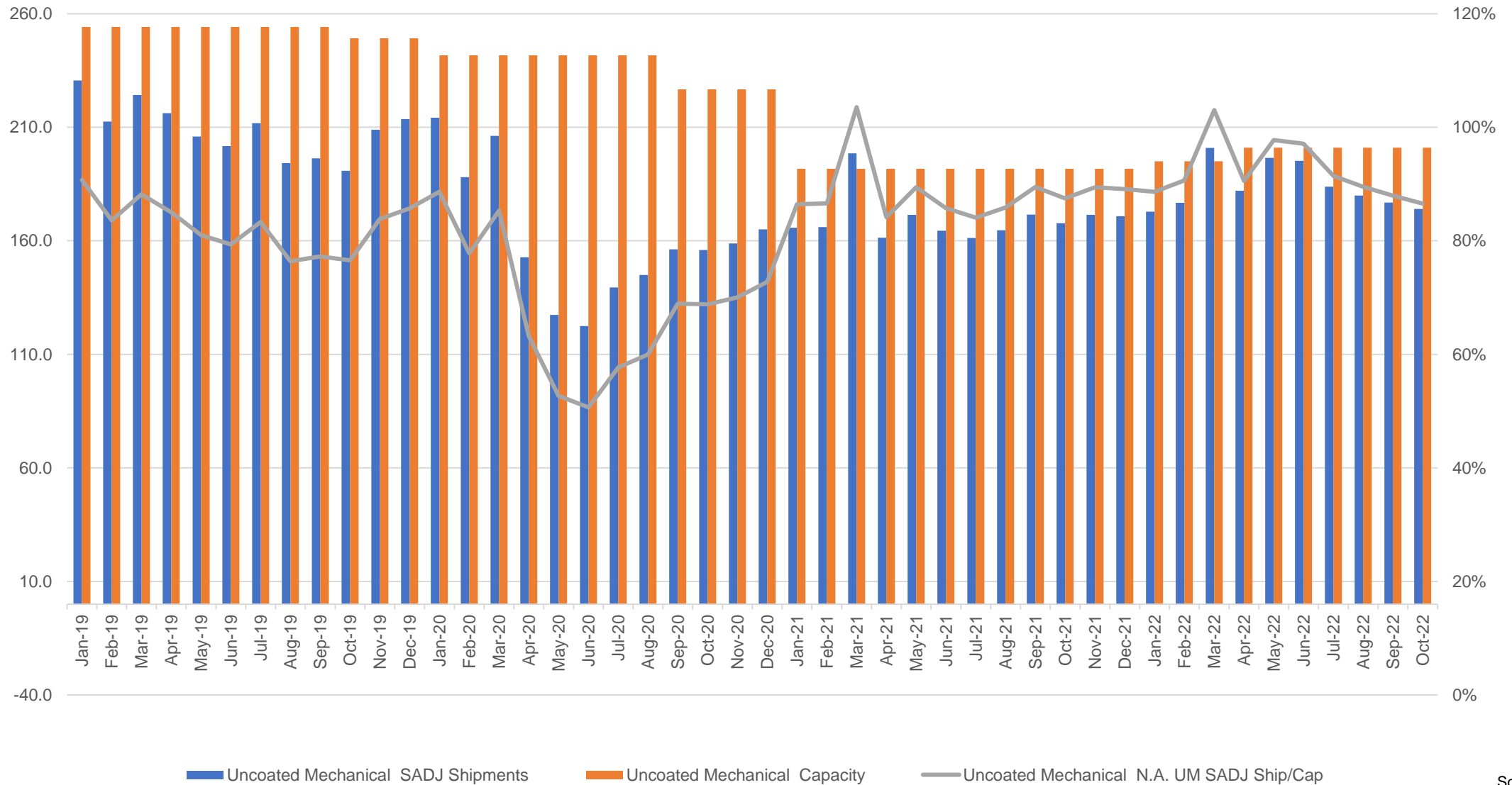
Source: RISI Paper Trader Table A6 and Pulp & Paper Week Price Watch

# U.S. UNCOATED GROUNDWOOD MILL OPERATING RATE FORECAST



\* Includes SC, does not include Newsprint

# N.A. UNCOATED GROUNDWOOD MILL OPERATING RATES



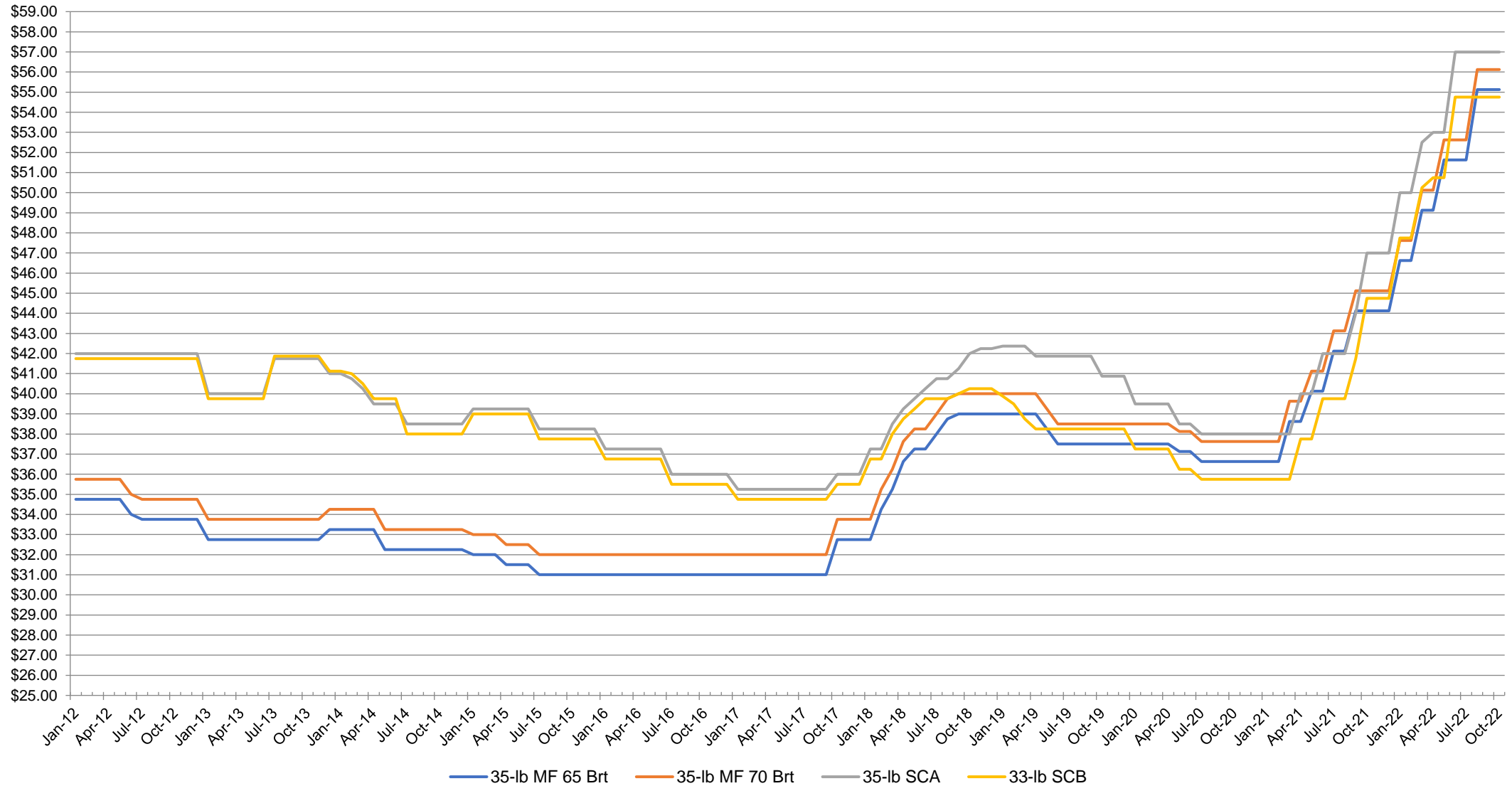
# SIGNIFICANT SUPER CALENDER CLOSURES SINCE 2011



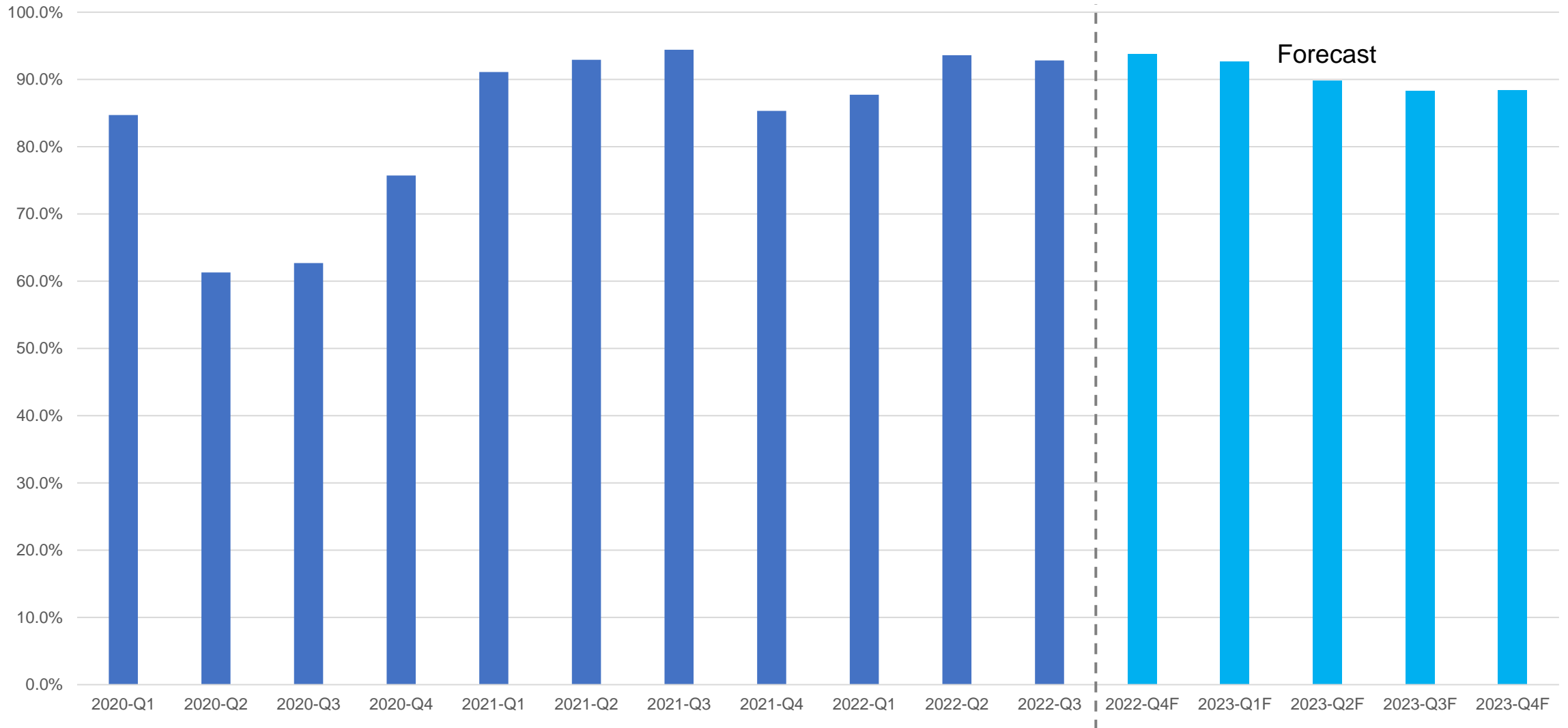
Company	Location	Annual Net Change (Short Tons)	SC Papers		Comments
			Effective Date	Segment	
St. Mary's Paper	Sault Ste, Marie, Ontario	(145,000)	Mar-11	SC	indefinite shut
New Page	Port Hawkesbury, Nova Scotia	(396,000)	Sep-11	SC	indefinite shut
Verso	Sartell, MN	(103,000)	Dec-11	SC	permanent shut PM 1 & PM2
Mylykoski/UPM	Anjalankoski, Kouvola, Finland	(354,000)	Dec-11	SC	Mill shuttered
Verso	Sartell, MN	(35,000)	May-12	SC	permanent shut of mill
Resolute	Dolbeau, SC	154,000	Sep-12	SC	produces SNC 7 SCB
Port Hawkesbury Paper	Port Hawkesbury, Nova Scotia	397,000	Oct-12	SC	restart of PM
Resolute	Laurentide, Quebec	(138,000)	Nov-12	SC	indefinite shut PM10
UPM	Ettringen, Germany	(198,000)	May-13	SC	Shutdown PM4 (SCB)
UPM	Rauma, Finland	(265,000)	May-13	SC	Shutdown PM3
Holmen	Hallsta, Sweden	(154,000)	Q4-13	SC	Shutdown PM3
Resolute	Laurentide, Quebec	(211,000)	Oct-14	SC	Mill shuttered
UPM	Jamsankoski, Finland	(258,000)	Q1-15	SC	Shutdown PM5
Holmen	Braviken, Sweden	341,000	Jun-15	SC	Restart PM 5B
UPM	Madison, ME	(240,000)	May-16	SC	Mill shuttered
UPM	Steyrermuhl, Austria	(110,000)	Dec-16	SC	Shutdown PM3
UPM	Augsburg, Germany	(220,000)	Dec-16	SC	Shutdown PM2
UPM	Rauma, Finland	(265,000)	Dec-19	SC	Shutdown PM2
Verso	Duluth, MN	(270,000)	Jun-20	SC	Shutdown PM1
Norske Skog	Saugbrugs, Norway	(110,000)	Q4-2020	SC	Shutdown PM5
Stora Enso	Kvarnsveden, Sweden	(440,000)	Sep-21	SC	Mill shuttered
Heinzel	Laakirchen, Austria	(363,000)	H1-2023	SC	closure announced
	<b>net change</b>	<b>(3,383,000)</b>			

- Verso shuts Duluth, MN mill.
- Norske Skog permanently ceased production of one SC Machine in Saugbrugs, Norway.
- SCA Ortviken Sweden announced a mill conversion of one SC machine and discontinued production of publication paper.
- Stora Enso permanently closes down Kvarnsveden mill in Sweden.
- Heinzl will withdraw from the publication paper market in 2023, rebuilding PM11 to produce recycled lightweight liner and fluting.

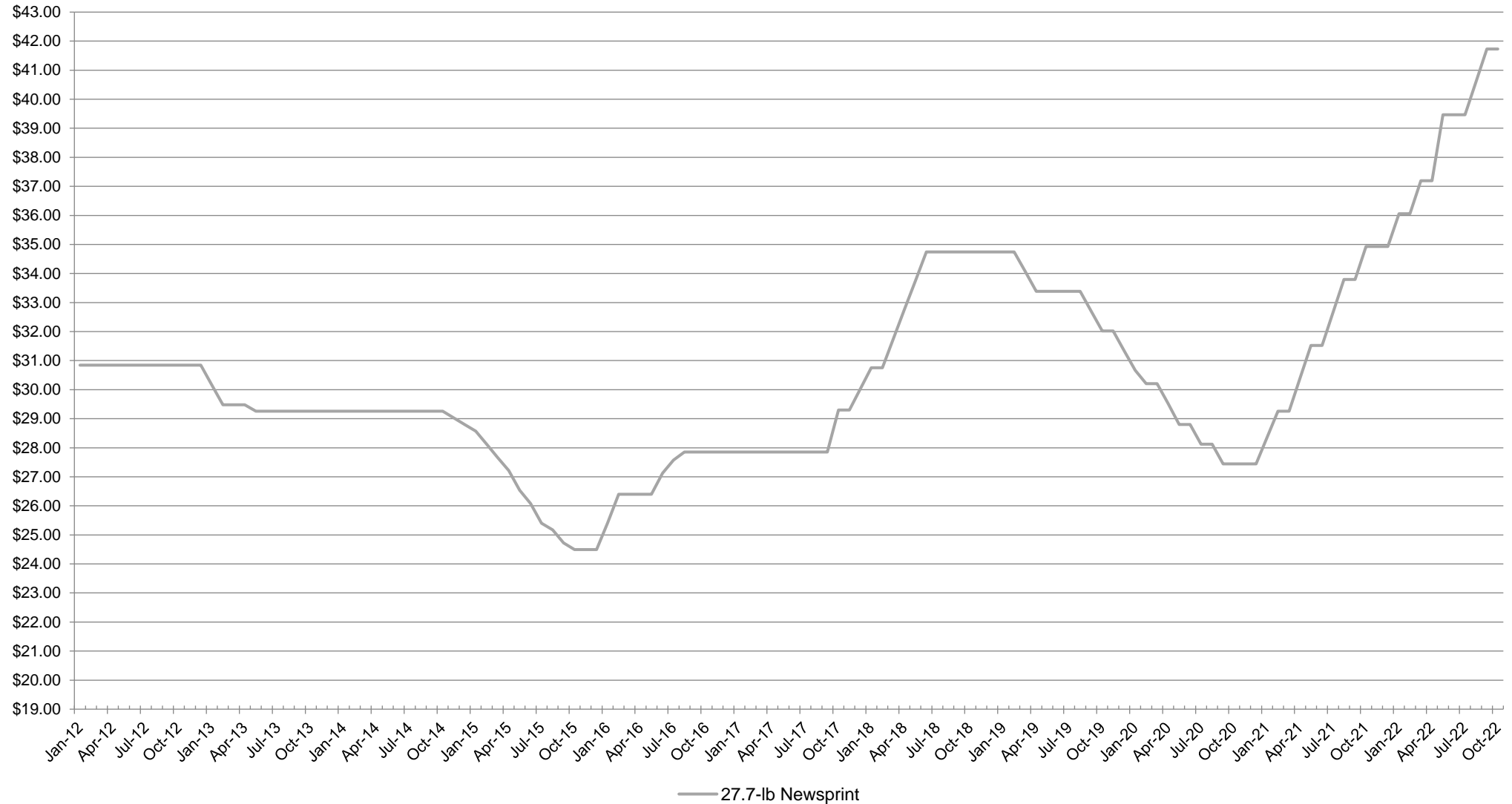
## SC Papers



# N.A. NEWSPRINT MILL OPERATING RATE FORECAST



## Newsprint





What is the plan and timeline for the Billerud Escanaba mill packaging conversion?

Does Billerud have any plans to sell or restart the Wisconsin Rapids mill?

How will the Resolute Forest Products acquisition by Paper Excellence impact the market?

Will high input prices lead to additional permanent mill capacity reduction or more conversions?

What is the long-term impact of paper supply being lost to machine conversions and closures?

How does the ongoing mill grade and basis weight rationalization put pressure on the industry?

Who will purchase the remaining two Stora Enso mill locations that are for sale?

What transpires with book printing and binding capacity with continued strong demand?

Will higher prices and economic conditions force companies to pull back print quantities in 2023?

Is there now light at the end of the tunnel for this oversold market and the transportation challenges?

How does the trend toward carbon reduction, plastic-free, and PFAS-free packaging impact the industry?

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