

MIDLAND



PACKAGING • PAPER • PERFORMANCE

MARKET UPDATE

NOVEMBER 2021

➤ **Demand Significantly Outpaces Supply Creating Paper and Print Shortage**

Paper Mill Capacity Reduction

- Stora Enso Veitsiluoto and Kvarnsveden Closures
- ND Paper Rumford Mill R15 Conversion
- Norske Skog Saugbrugs PM5 Shutdown
- UPM Announces Kaipola Mill Closure
- SCA Announces Ortviken Mill Conversion
- Stora Enso Oulu Mill Conversion
- Domtar Announces Port Huron Closure
- Evergreen Packaging Discontinued Coated Groundwood Grades at Pine Bluff Mill

Printing Industry In Flux

- RR Donnelley acquired by Atlas Holdings
- Times Printing LLC acquired by CJK Group
- Creel Printing Assets acquired by Mittera Group
- Trend Offset acquired by Mittera Group
- Quad Oklahoma City Plant Closure
- LSC Spartanburg, SC Plant Closure
- Arandell shut down Kentucky; Arandell acquired by Saothair Capital Partners
- Bertelsmann (Berryville Graphics) Acquires two remaining Quad Book Plants

➤ **Ongoing Mill Price Increase Announcements and Implementation**

➤ **Massive Shipping Crisis**

➤ **Atlas Holdings Negotiation to Buy Verso Corp. (includes Wisconsin Rapids Mill)**

Mill shutdowns and conversions over the past few years have significantly reduced the overall paper supply. Plus, we are seeing a significant increase in demand as companies work through the pandemic and continue to ramp up their businesses.

Factor in five-year low mill inventories and reduced imports, and we are seeing very high mill operating rates. Rising fuel and energy costs, continued transportation challenges, hiring challenges to run the machines, and high pulp and other input (titanium dioxide, starch, latex) costs are adding fuel to the fire. These conditions have provided the backdrop for paper mills to successfully implement a series of price increases across all grades lines.

In short, demand is far outstripping supply on all grades and this has led to an allocated and oversold market where securing paper and delivering it on time has become an overwhelming challenge.

Mill / Machine Closures and/or Bankruptcies:

- Norpac PM1 Longview, WA, White Birch Ashland, Resolute Forest Products Thorold idled - 900,000 annual 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, Jukkaido 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 – 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 Wis. Rapids – 810,000 tons of coated and super cal (2020 Q2)
- Pondaray Newsprint Company, Newport, WA (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)
- 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 \(2021 Q4\)](#)

Mill / Machine Conversions:

- Sappi Somerset PM1 - Rebuild to add packaging capabilities 198,000 tons (2018 Q2)
- Verso Jay PM#3 - 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 PM#5– 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)

Mill Acquisitions:

- 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, SC mill acquired by New-Indy Containerboard (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)
- Caraustar 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 Specialty Solutions (2020)
- Midwest Paper acquired by Industrial Opportunity Partners (2020)
- Appvion Point of Sale business acquired by Domtar (2020 Q2)
- Pixelle acquires Specialty Papers business from Appvion (2021 Q2)

Mill / Machine Re-Starts:

- Norpac restarts PM1 Longview, WA (2018 Q2)
- Appleton Coated Mill restarts as Midwest Paper Group – packaging and UFS (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. restarts as Willamette Falls Paper Co. (2019 Q3)
- Flambeau River Papers restarts as Park Falls Pulp & Paper (2020 Q4)

Printer Acquisitions / Partnerships / Mergers:

- Creel Printing – acquired by LSC Communications (2017)
- Fairrington – 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)
- Cenveo (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)
- Cenveo Cadmus Lancaster, PA and Hurlock, MD locations - acquired by Intellicor Comm (Q2 2020)
- Cenveo Publisher Services and Cenveo 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 Saothair 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)
- Cenveo 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 \(Q4 2021\)](#)
- [RR Donnelley & Sons Company – Acquired by Atlas Holdings LLC \(Q4 2021\)](#)

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)

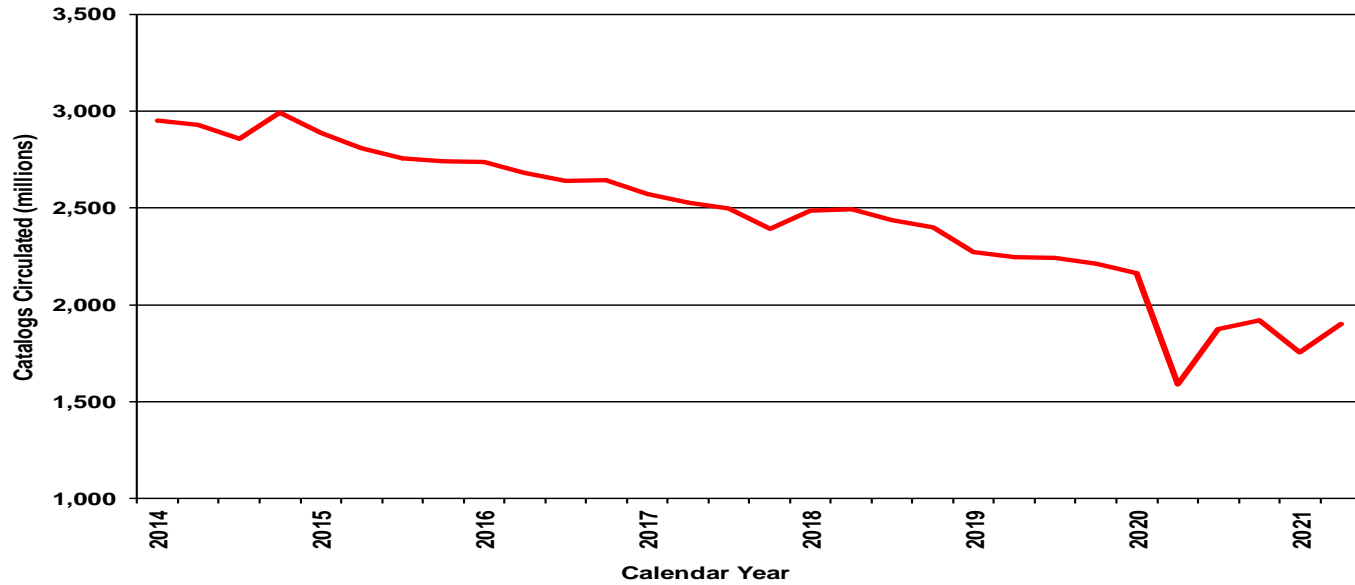
Printer Closures - Continued:

- Sentinel Printing, St. Cloud, MN (Q4 2019)
- 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)
- SCNG Anaheim, CA (Q1 2022)

Printer Bankruptcies:

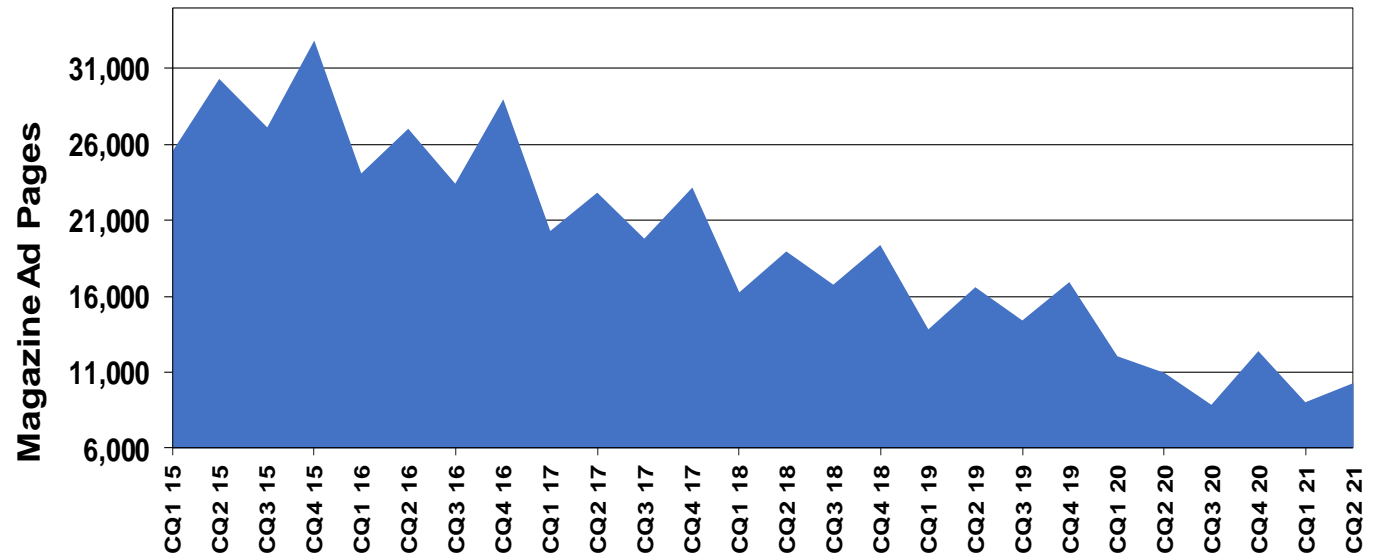
- Boss Litho, Inc. City of Industry - Chapter 11 Filing (2018)
- Cenvéo, Inc. - Chapter 11 Filing (2018)
- Medallion Press, Inc. – Chapter 7 Filing (2018)
- Scheffer Printing, LLC – Chapter 7 Filing (2020)
- LSC Communications – Chapter 11 (2020)
- Arandell – Chapter 11 (2020)

MAGAZINE AD PAGES AND CATALOG CIRCULATION

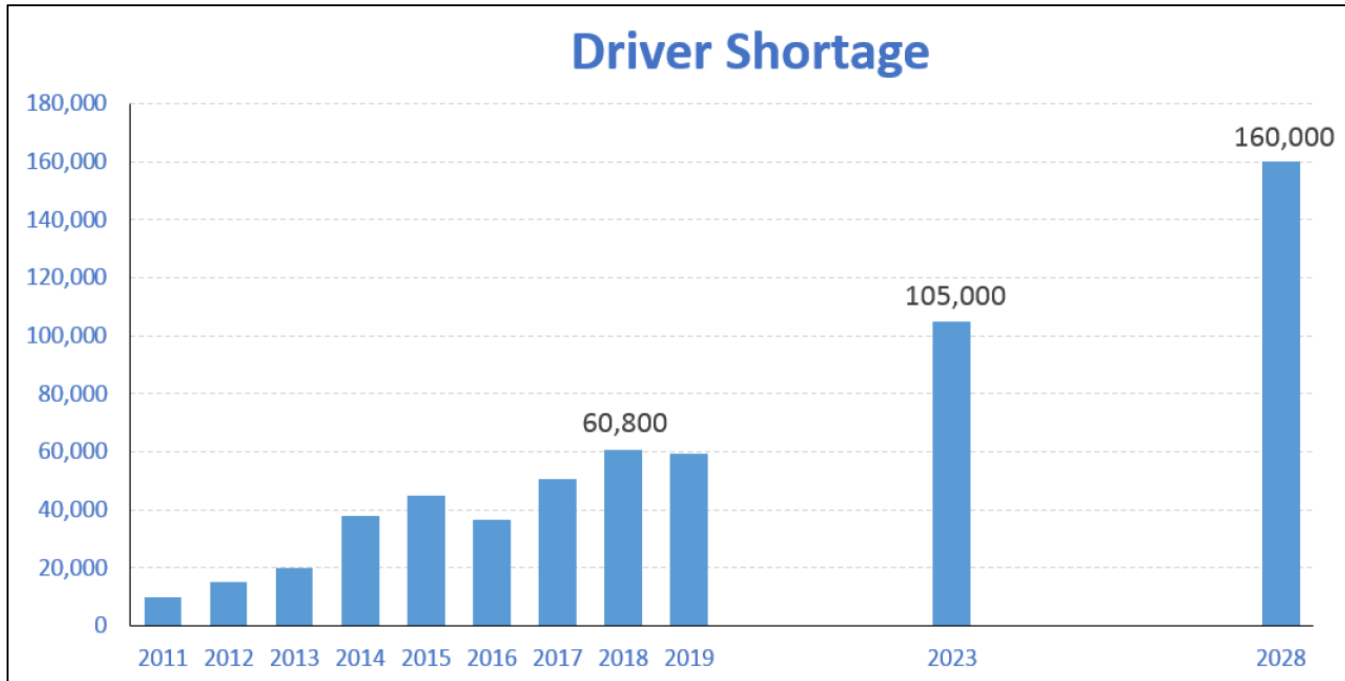


Catalog Circulation was down 3% in the first half of 2021 and was **up 19.7%** in Q2 versus the same quarter in 2020

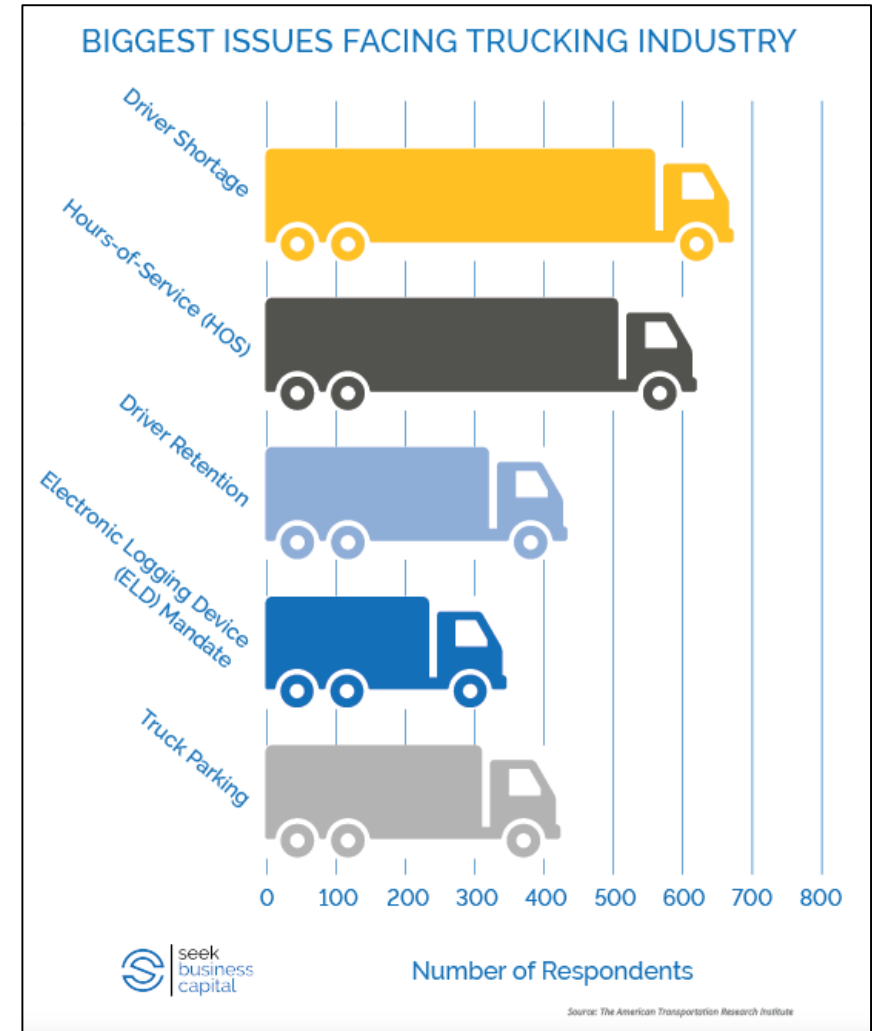
Magazine Ad Pages were down 16% in the first half of 2021 and were **down 6.1%** in Q2 versus the same quarter in 2020



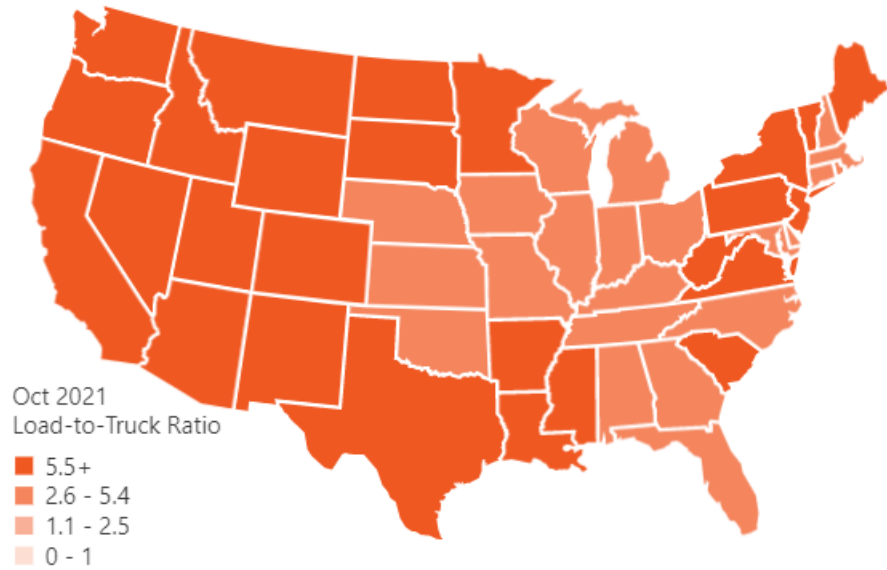
TRUCK DRIVER SHORTAGE TREND



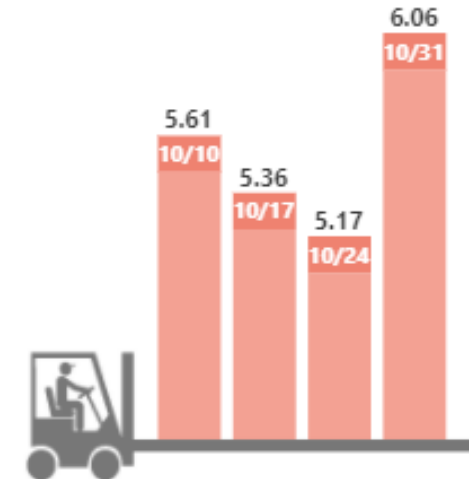
- Over the next decade the trucking industry will need to hire roughly 898,000 new drivers (90,000 drivers per year) to replace retiring truck drivers and industry growth. America will be short 175,000 drivers by 2026. The average age of a commercial truck driver in the U.S. is 55 years old. The shortage 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 29, 2021, the national average annual pay is \$54,653.



Sources: American Trucking Associations Truck Driver Shortage Analysis 2018, FleetOwner, Truck Driver Shortage on Course to Double in a Decade 2019, and Truckdriverssalary.com



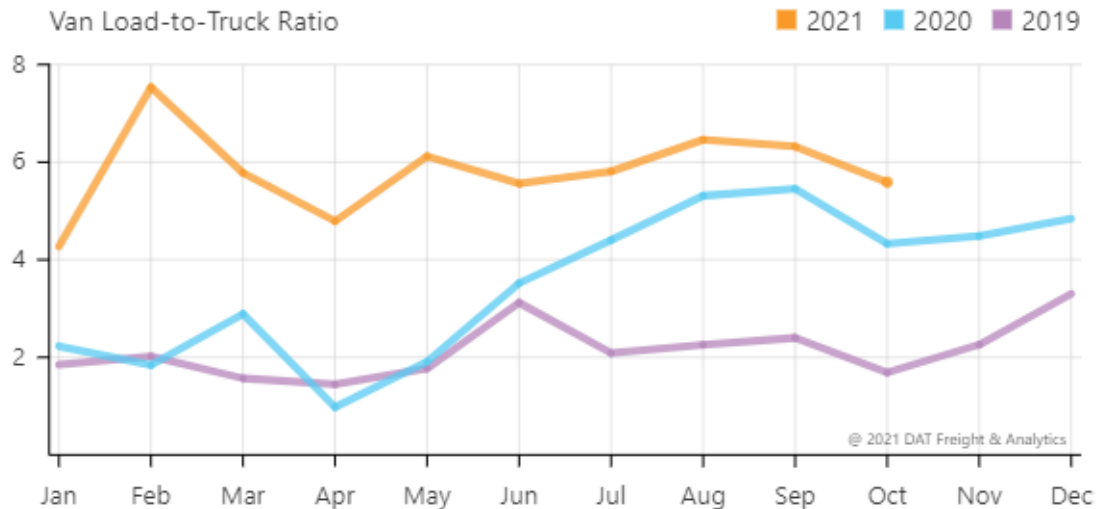
National Load-to-Truck Ratio



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 October 2021 Van Load-To-Truck ratio is up 28.9% over October 2020.

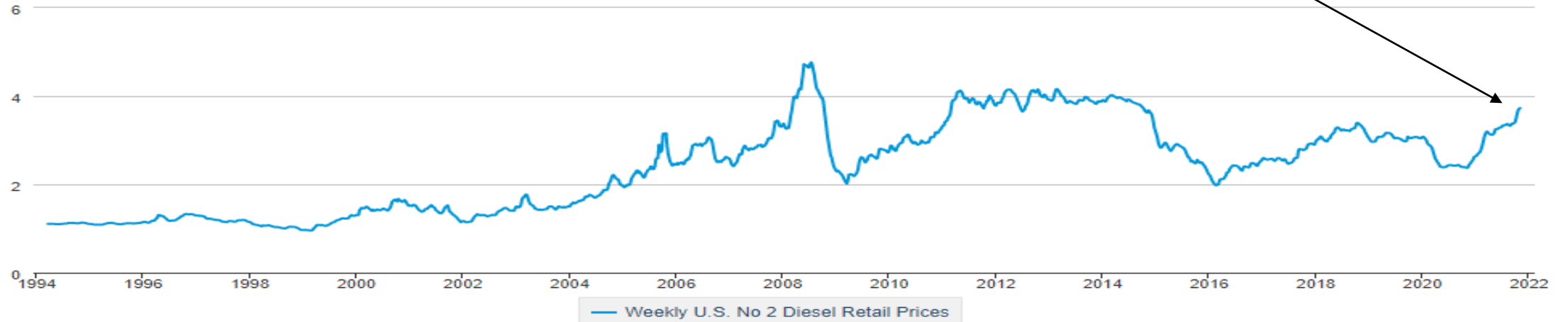
Van Spot Rates are up 19.2% over October 2020.



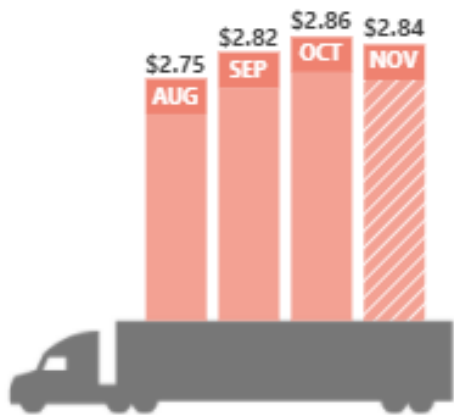
DIESEL FUEL PRICES AND VAN HAUL RATES

Weekly U.S. No 2 Diesel Retail Prices

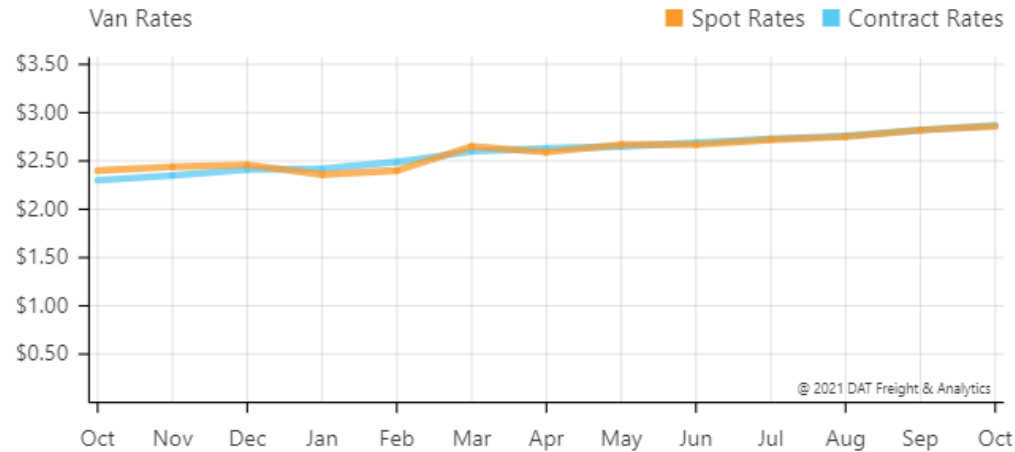
Dollars per Gallon



eia Source: U.S. Energy Information Administration

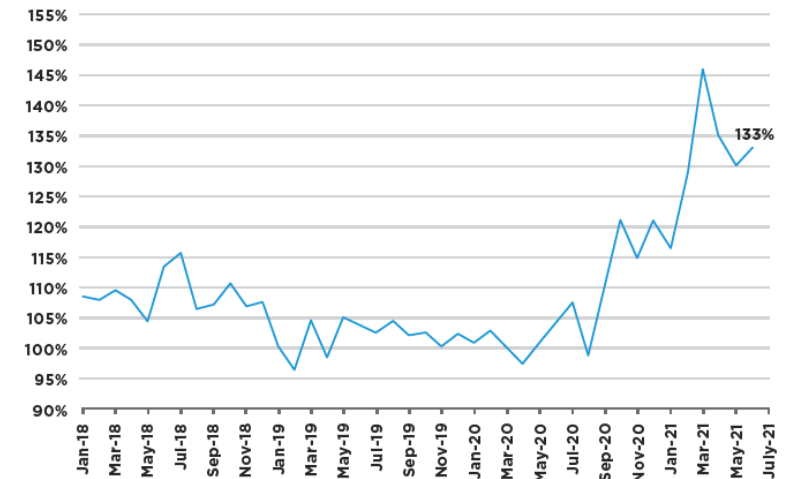


Source: U.S. Energy Information Administration

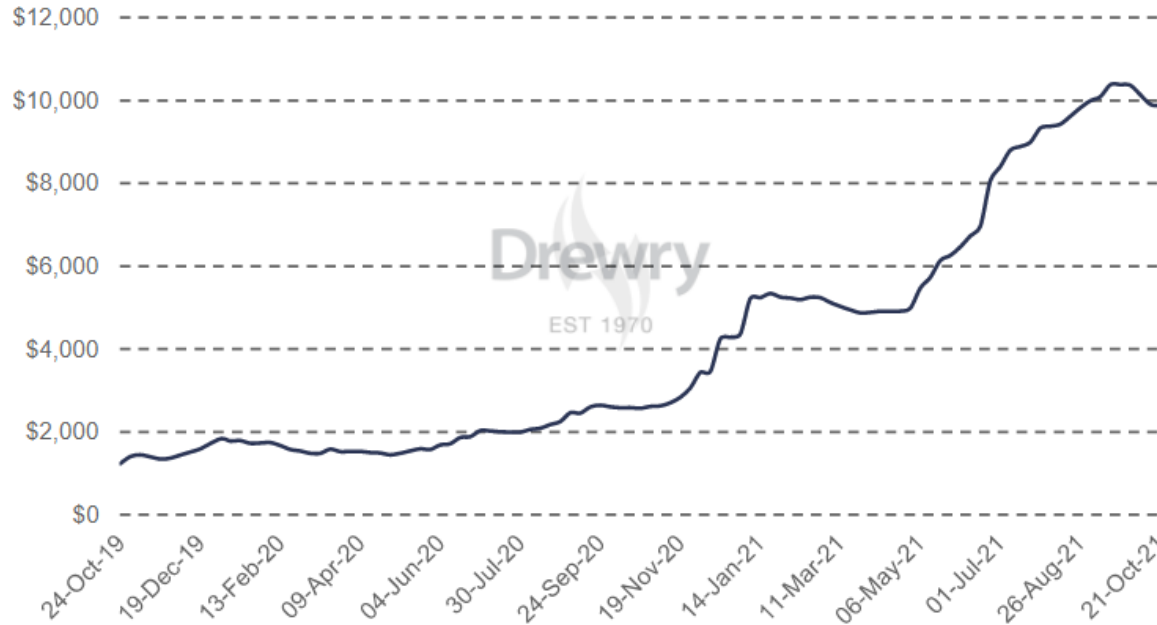


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Freight Increase off Jan 2020 Benchmark

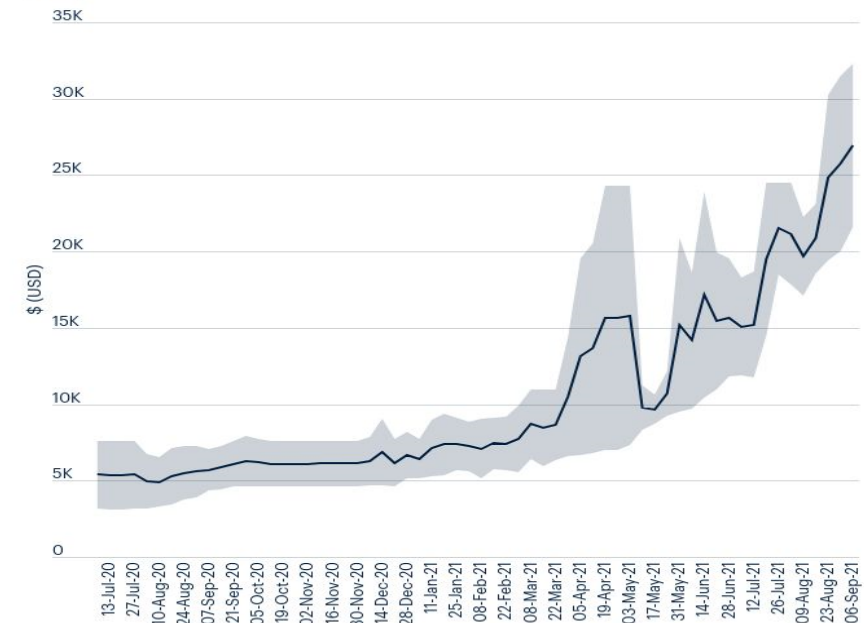


World Container Index - Assessed by Drewry
\$ per 40 ft container



Asia to North America shipping

FBX China/East Asia - North America East Coast weekly freight pricing range for 40' containers (FEUs)



Source: Freightos - fbx.freightos.com (updated 06 September 2021)

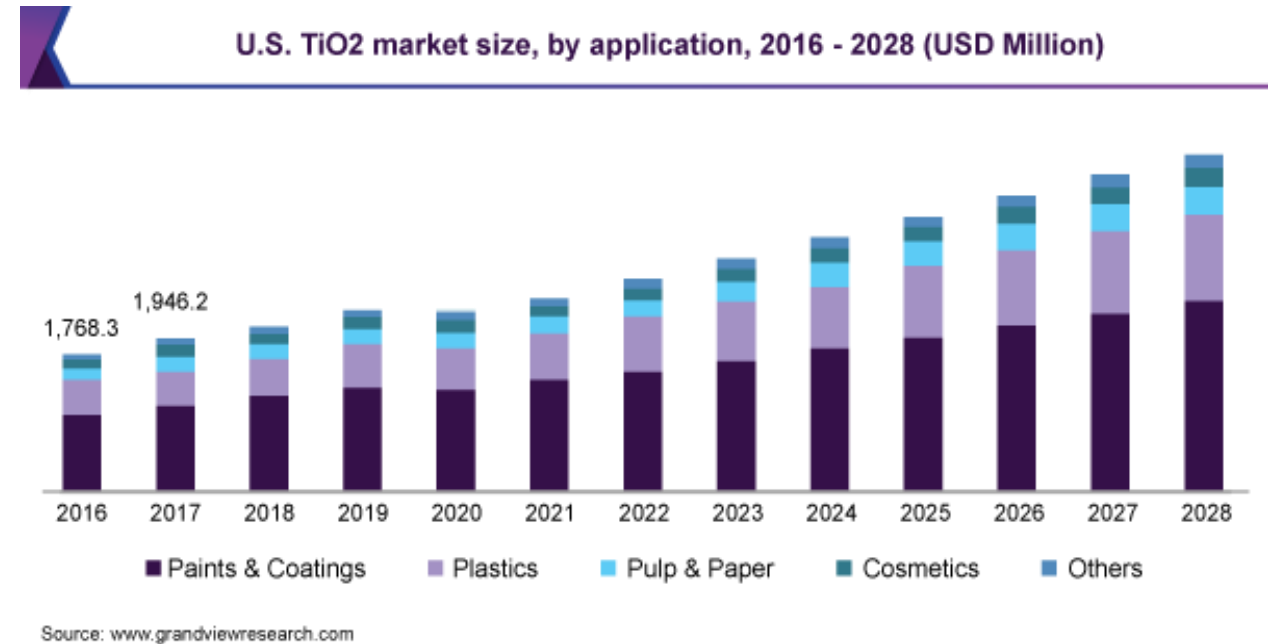
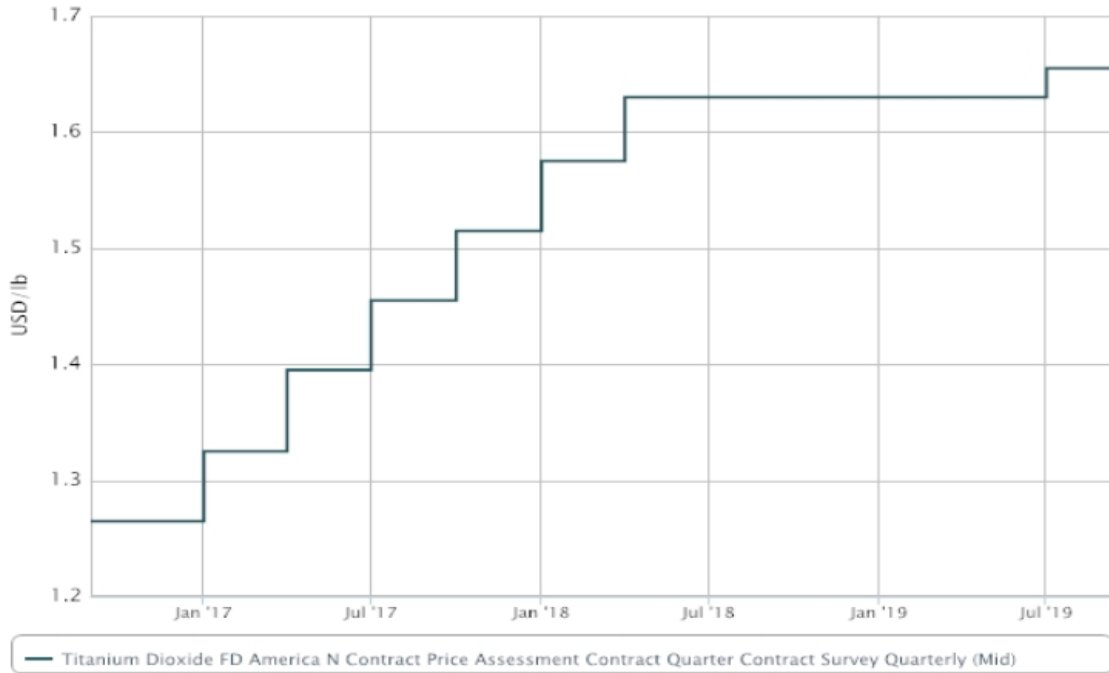
The Drewry World Container Index (WCI), which measures the price of a shipping container, is **up 276%** from this same time last year, at **\$9,669**.

The average composite index of the WCI year-to-date is \$7,248 per 40 ft container, which is \$4,687 higher than the 5 year average of \$2,561.

The global shortage of shipping containers, primarily caused by the pandemic, has led to drastic inflation in shipping and container prices and increased delay times for companies that move items all over the world. Shipments to NA out of East Asia are almost double the average.

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

TiO₂ is a filler used in the papermaking process to make paper whiter and stronger.

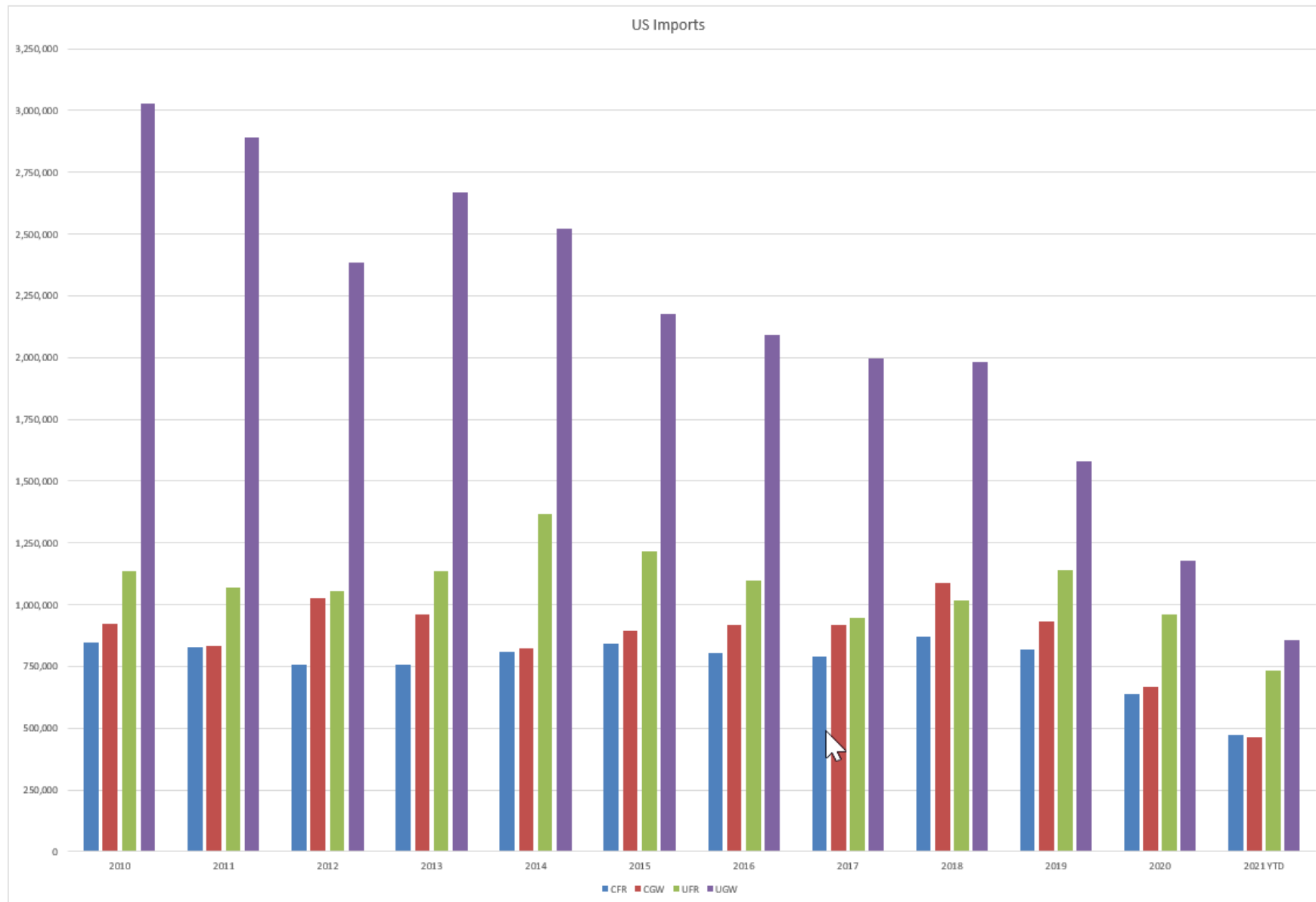


North America 2021 Q2 TiO₂ Supply and Demand

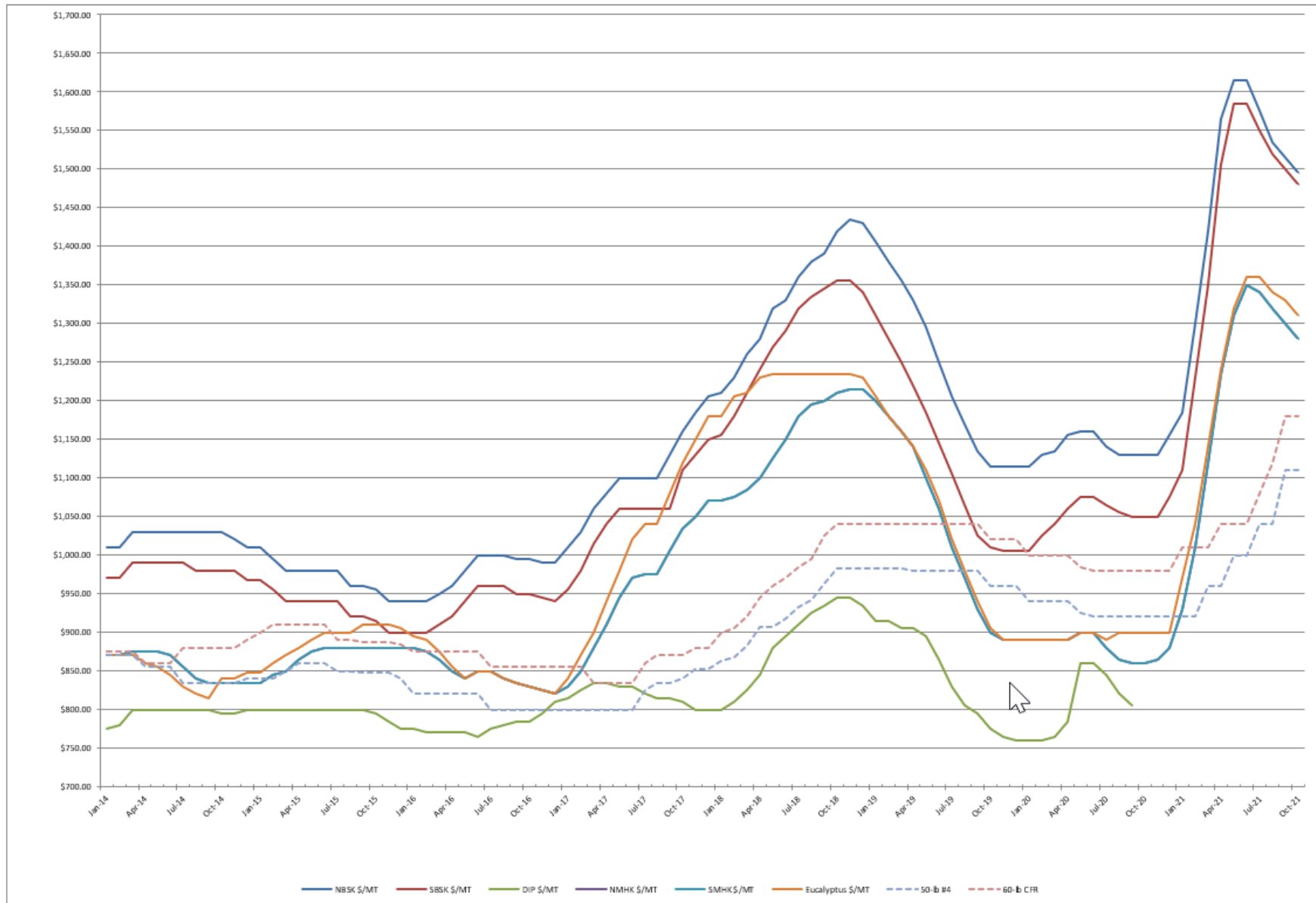
Supply North American supply is expected to tighten moderately as chemical intermediates become more available to paint makers allowing paint production to increase seasonally in the second and third quarters. Some market participants have suggested the spring paint season may be delayed if shortages of key solvents and other paint intermediates persist, but ongoing labor shortages due to COVID-19 and the delay of construction projects due to lumber shortages also remain potential obstacles.

Demand is expected steady to stronger in Q2 stemming from heightened demand typically seen from construction markets during the peak spring paint and coatings season – especially if housing numbers begin to tick upward. Typically, TiO₂ tracks GDP, and US GDP forecasts for 2021 also are ramping up, with the Federal Reserve and economists making upside revisions as the economy opens up amid ongoing coronavirus vaccinations and as another federal stimulus package is implemented.

U.S. IMPORT TRENDS (2010 – 2021)



NORTH AMERICAN MARKET PULP PRICES



Market pulp prices topped out, but still high!

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 still exceeding those levels today, it could once again post a significant challenge to these non-integrated mills.

RISI PAPER TRADER TABLE A6



	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021
US PRICES														
Uncoated freesheet papers														
20 lb copy paper 92 bright	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,080	1,120	1,120	1,150	1,180	1,180	1,180
%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	3.7	0.0	2.7	2.6	0.0	0.0
50 lb offset rolls 92 bright	955	955	955	955	955	955	955	975	1,015	1,015	1,045	1,075	1,075	1,075
%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	4.1	0.0	3.0	2.9	0.0	0.0
20 lb formbond stock tab	1,045	1,045	1,045	1,045	1,045	1,045	1,045	1,065	1,105	1,105	1,135	1,165	1,165	1,165
%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	3.8	0.0	2.7	2.6	0.0	0.0
Coated papers														
Premium 80 lb sheets	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,470	1,500	1,500	1,500	1,540	1,540	1,590
%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	2.0	0.0	0.0	2.7	0.0	3.2
Economy 80 lb sheets	1,153	1,153	1,153	1,153	1,153	1,153	1,153	1,193	1,223	1,223	1,263	1,303	1,303	1,353
%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.5	0.0	3.3	3.2	0.0	3.8
No. 3 60 lb rolls	980	980	980	980	980	1,010	1,010	1,010	1,040	1,040	1,080	1,080	1,120	1,180
%	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	3.0	0.0	3.8	0.0	3.7	5.4
Ctd grwd No. 4 (78/80) 50 lb	920	920	920	920	920	920	920	960	960	1,000	1,000	1,040	1,040	1,110
%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	4.2	0.0	4.0	0.0	6.7
No. 5 34 lb rolls	965	965	965	965	965	965	965	1,005	1,005	1,045	1,045	1,085	1,085	1,145
%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.0	4.0	0.0	3.8	0.0	5.5
No. 5 40 lb rolls	830	830	830	830	830	830	830	870	870	910	910	950	950	1,010
%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	4.6	0.0	4.4	0.0	6.3
Uncoated mechanical papers														
Supercalendered paper 35 lb (SC-A)	760	760	760	760	760	760	760	760	800	800	840	840	880	880
%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.0	5.0	0.0	4.8	0.0
Offset substitute 45 lb 83/84 bright	878	878	878	878	878	878	878	918	918	948	948	988	988	1,023
%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	3.3	0.0	4.2	0.0	3.5

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-19	247.2	270.0	92%	Jan-19	150.4	175.4	86%	Jan-19	648.0	736.0	88%	Jan-19	230.6	254.2	91%
Feb-19	219.8	270.0	81%	Feb-19	135.6	175.4	77%	Feb-19	654.0	736.0	89%	Feb-19	212.5	254.2	84%
Mar-19	228.2	270.0	85%	Mar-19	148.9	175.4	85%	Mar-19	630.0	736.0	86%	Mar-19	224.2	254.2	88%
Apr-19	222.2	265.0	84%	Apr-19	136.9	175.4	78%	Apr-19	637.0	683.0	93%	Apr-19	216.2	254.2	85%
May-19	236.1	265.0	89%	May-19	146.6	175.4	84%	May-19	601.0	683.0	88%	May-19	205.9	254.2	81%
Jun-19	213.1	265.0	80%	Jun-19	130.7	175.4	75%	Jun-19	595.0	683.0	87%	Jun-19	201.7	254.2	79%
Jul-19	225.8	246.9	91%	Jul-19	142.6	175.4	81%	Jul-19	602.0	683.0	88%	Jul-19	211.8	254.2	83%
Aug-19	225.0	246.9	91%	Aug-19	140.2	175.4	80%	Aug-19	586.0	683.0	86%	Aug-19	194.2	254.2	76%
Sep-19	231.8	246.9	94%	Sep-19	134.3	175.4	77%	Sep-19	609.0	683.0	89%	Sep-19	196.3	254.2	77%
Oct-19	242.9	248.4	98%	Oct-19	150.5	171.1	88%	Oct-19	632.0	667.0	95%	Oct-19	190.8	249.2	77%
Nov-19	227.6	248.4	92%	Nov-19	132.6	171.1	77%	Nov-19	572.0	667.0	86%	Nov-19	208.9	249.2	84%
Dec-19	225.5	248.4	91%	Dec-19	132.3	171.1	77%	Dec-19	622.0	667.0	93%	Dec-19	213.6	249.2	86%
	2,745.2	3,090.9	89%		1,681.6	2,091.9	80%		7,388.0	8,307.0	89%		2,506.7	3,035.4	83%
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%
YTD	2,160.9	2,674.8	81%		1,239.1	1,772.6	70%		6,194.0	7,595.1	82%		1,931.7	2,840.4	68%
Jan-21	167.7	180.0	93%	Jan-21	82.7	105.3	79%	Jan-21	500.0	574.7	87%	Jan-21	166.1	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	166.4	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	198.9	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	161.3	194.0	83%
May-21	188.3	181.7	104%	May-21	105.3	105.3	100%	May-21	504.0	548.7	92%	May-21	170.3	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	163.3	194.0	84%
Jul-21	187.4	181.7	103%	Jul-21	92.9	107.3	87%	Jul-21	528.0	548.7	96%	Jul-21	160.1	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	163.5	190.7	86%
Sep-21	164.4	181.7	90%	Sep-21	101.9	107.3	95%	Sep-21	489.0	548.7	89%	Sep-21	170.4	190.7	89%

SIGNIFICANT COATED CAPACITY CHANGES SINCE 2011



Coated Groundwood					
Company	Location	Annual Net Change (Short Tons)	Effective Date	Segment	Comments
NewPage	Stavens 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
Mylykoski/UPM	Anjalankoski, Kouvola, Finland	(232,000)	Dec-11	CGW	Mill Closure
Mylykoski/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
Investsprom 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	PM 2 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	PM 8 Shift to packaging grades
Catalyst	Rumford, ME	(47,000)	Sep-15	CGW	PM 12 Indefinitely Idled
Verso	Jay, ME	(150,000)	Q4-15	CGW	PM 2 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	PM 12 restart - coated and uncoated
Norske Skog	Walsum, Germany	(225,000)	May-16	CGW	Permanent closure, PM10
Resolute	Catawba, SC	(190,000)	Jul-17	CGW	PM 2 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 Products
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
SCA	Otviken, Sweden	(561,000)	2021	CGW	convert mill to pulp only - +255K UGW
ND Paper USA	Rumford, ME	(115,000)	Q4-2020	CGW	convert R15 to linerboard
		net change	(6,008,000)		

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	PM6 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	Runford, ME	45,000	Jan-15	CFS	PM12 restarted
Catalyst	Runford, 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	PM6 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, Germany	(220,000)	2018	CFS	mill shut
Scheufelen	Germany	(132,000)	2018	CFS	mill shut
Lecta	Condat le Lardin, France	(253,000)	Apr-19	CFS	PM6 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	Tomioka, 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
		net change	(7,458,100)		

COATED AND SUPER CAL WEB GRADES REMAIN IN FLUX



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

ND Paper discontinued **Sirius**, their short-lived coated freesheet grade #2. Also removed long-time brands, **Vision**, **Dependoweb** and **Capri** from their line-up.

Catalyst discontinues all SC and Book grades that were made at Powel River mill.
Is Electracote Brite going away next?

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

Verso shuts down the Duluth mill and discontinues their SC grades (**Voyager** and **Superior**). Also, discontinues the **Velocity** and **Balance** grades.

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

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

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, LWU
PAPER MILLS									
Burgo		Tecno Plus (95 ISO) (Sa) R4 Gloss (95 ISO) (M) (Sa) (RG) Respecta Web (95 ISO) (M) (Sa)	Uno Bright (90-94 ISO) (Sa)		Uno Prime (88-89 ISO) (M) (Sa)			Uno Web (71-78 ISO) (RG)	
Catalyst					Advance (85-87) (87 M) Ascent (82-84) (M 83) (S 83) * available as Sage brand		Pacificote (79-80) Electracote Brite (75-76) * available as Sage brand	Electracote (71-73) * available as Sage brand	
Irving Paper									Opulence SCA++ (74-75) (RG) Radiance SCA+ (70) (RG) Irving SCA (68) (RG) Ultrasmooth SCB (65) (RG)
Kruger Paper					Krukote (80) (Sa) (pcw)		Krukote (76) (Sa) (pcw)	Krukote (70-72) (Sa) (HB-70)	
ND Paper		Orion (88) (Sa) (M) (pcw)		Oxford C1S (86) (HB 89)		Escanaba (80-82) (M 82) (RG 78-80) (pcw)		Consoweb (70-73) (Sa 73) (RG 71-73) (pcw) Consoweb HB (70-73) (pcw)	
Norske Skog (NorCell)			Norcote Trend H (92-95 ISO) Norcote Top H (92-93 ISO)		Norcote Super H (85-87 ISO) Norcote Silk H (86-88 ISO)			Norcote H (75-76 ISO) Norcote Satin H (76 ISO)	NorSC Polar (76-80 ISO) (RG) NorSC Lite (69 ISO) (RG) NorSC Value (65 ISO) (RG)
Port Hawkesbury									Artisan SCA++ (75-77) (80) (RG) Prominence Plus SCA+ (70-71) (RG) Prominence SCA (67-68) (RG) Maritime SCB (65) (RG)
Rayonier Advanced Materials		Kallima Web Coated Cover C1S / C2S (90)							
Resolute Forest Products									ResoluteSCA++ (75 ISO) ResoluteSCA+ (70-71 ISO) (RG) ResoluteSCA (68 ISO) ResoluteSCB (63 ISO) ResoluteSNC (63 ISO) ResoluteSelect (75, 70, 65) ResoluteBook (75, 70, 65, 60)
Sappi	McCoy (96) (M) (Si) (V) Opus (92) (D) (Sa) (M) (pcw) Opus PS (92) (D) (M) (pcw) Opus 30 (92) (D) (M)	Somerset (88) (M) (Sa) (pcw)	Galerie Fine (92-99 ISO) (Si) (HB)	Flo Web (82-83) (M) (pcw)	Galerie Brite (85-87 ISO) (HB)			Galerie Lite (68-73 ISO) (HB)	
Steinbeis							Charisma Brilliant Plus (81 ISO) Charisma Brilliant (79-80 ISO) Silk (81.5-83 ISO)		
Stora Enso	Lumi (99 ISO) (Si)						StellaPress (87 ISO) (HB)		MagniPress SCA+ (71-75 ISO) (RG) PubliPress SCA (67 ISO) (Sa) (RG) Envipress SCB (66-67 ISO) (RG) PrimaPress (80-81 ISO) (RG)
Twin Rivers Paper Company									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) FraBrite (72 & 76 ISO) (pcw)
UPM	Finesse (EU 95) (Si) (M) (RG)		Star (EU 87-92) (RG EU 88) (M) Star Silk (EU 91-92) (RG EU 88) 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 76) Valor Gravure (76)	Cote H (70-71) (EU 70-80) (RG 70-71) (RG EU 70-76)	Smart SCA++ (76-80) (RG 76-78) Impresse Plus SCA+ (80) (RG) Cat SCA+ (70-72) (RG 68-76) Max SCA (66-68) (RG) Impresse SCA (68) (RG) Eco SCB (63-74) (RG 63)
Verso Corp.		Sterling Ultra Web (88-90) (D 90) (M 90) (pcw) ArborWeb Plus (88-90) (D 90) (M 90) (pcw) Sterling Ultra Caliper (90) (M) (D)		Influence (86-88) (M) (SG) (RG 88) (pcw) ArborWeb (86-88) (SG) (pcw)	Velocity (85-86) (D) Liberty (82-84) (D 82) (M 83) (pcw)		Balance (80) (pcw)		
WestRock	Tango Coated Cover C1S (92)								
Willamette Falls	Capistrano (92) (D) (M) (pcw) Nature Plus (92) (D) (M)				Sonoma (86-88) (D) (M) (pcw) Nature Web (86-88) (D) (M)				

* Grades listed as Gloss finish; Options: (Cr) Cream, (D) Dull, (GFG) Glare Free Gloss, (LG) Low Glare, (M) Matte, (Sa) Satin, (Si) Silk, (Su) Suede, (SG) Soft Gloss, (V) Velvet, (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%
Total	3,850,000	

January 2021

COATED
FREESHEET

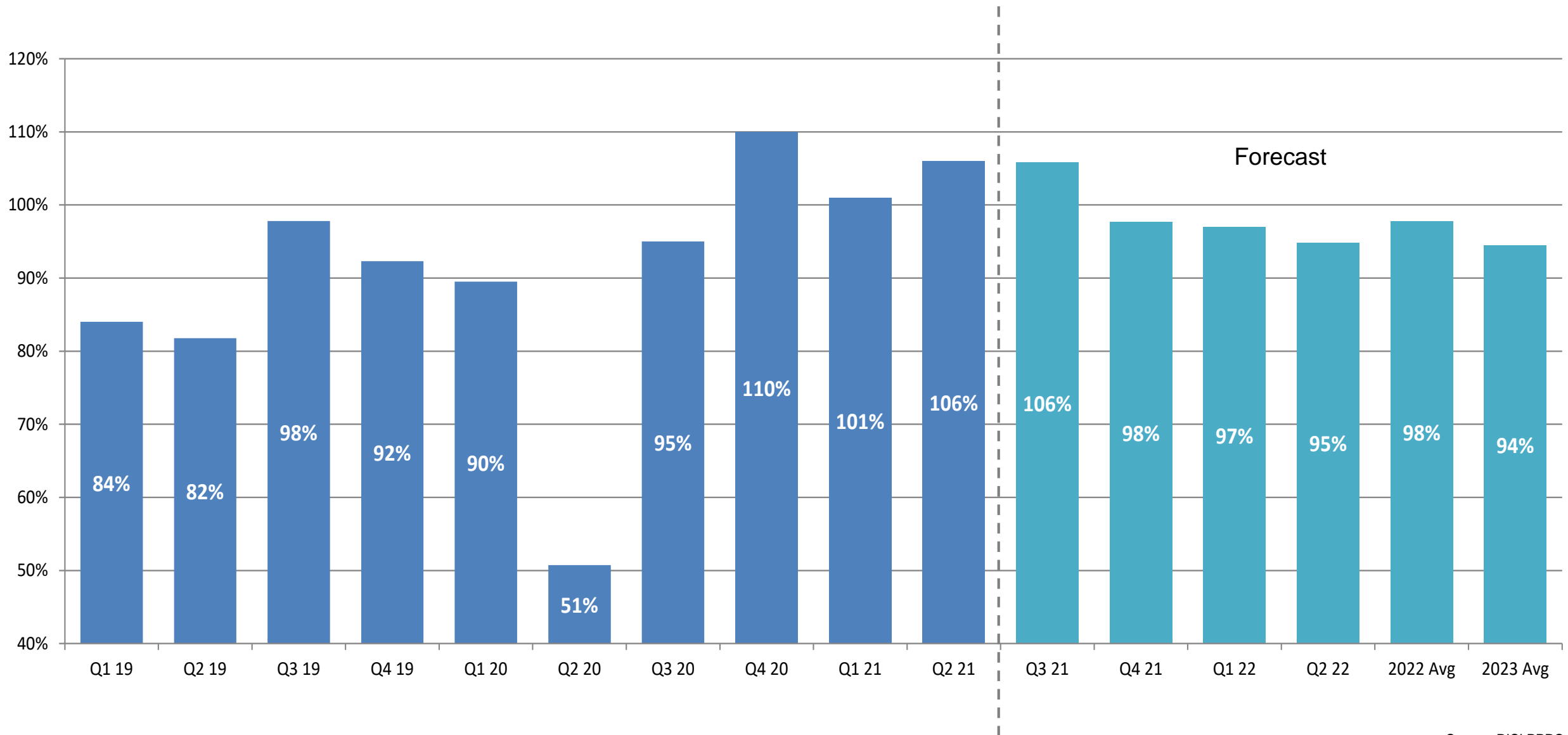
Company	Volume (tons)	Market Share
Sappi	1,000,000	49.6%
Verso	730,000	36.2%
Willamette Falls Paper	200,000	9.9%
ND Paper	85,000	4.2%
Catalyst	0	
Appleton Coated	0	
Total	2,015,000 *	

- 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 away from coated graphic papers to packaging and other grades.

U.S. COATED FREESHEET MILL OPERATING RATE FORECAST

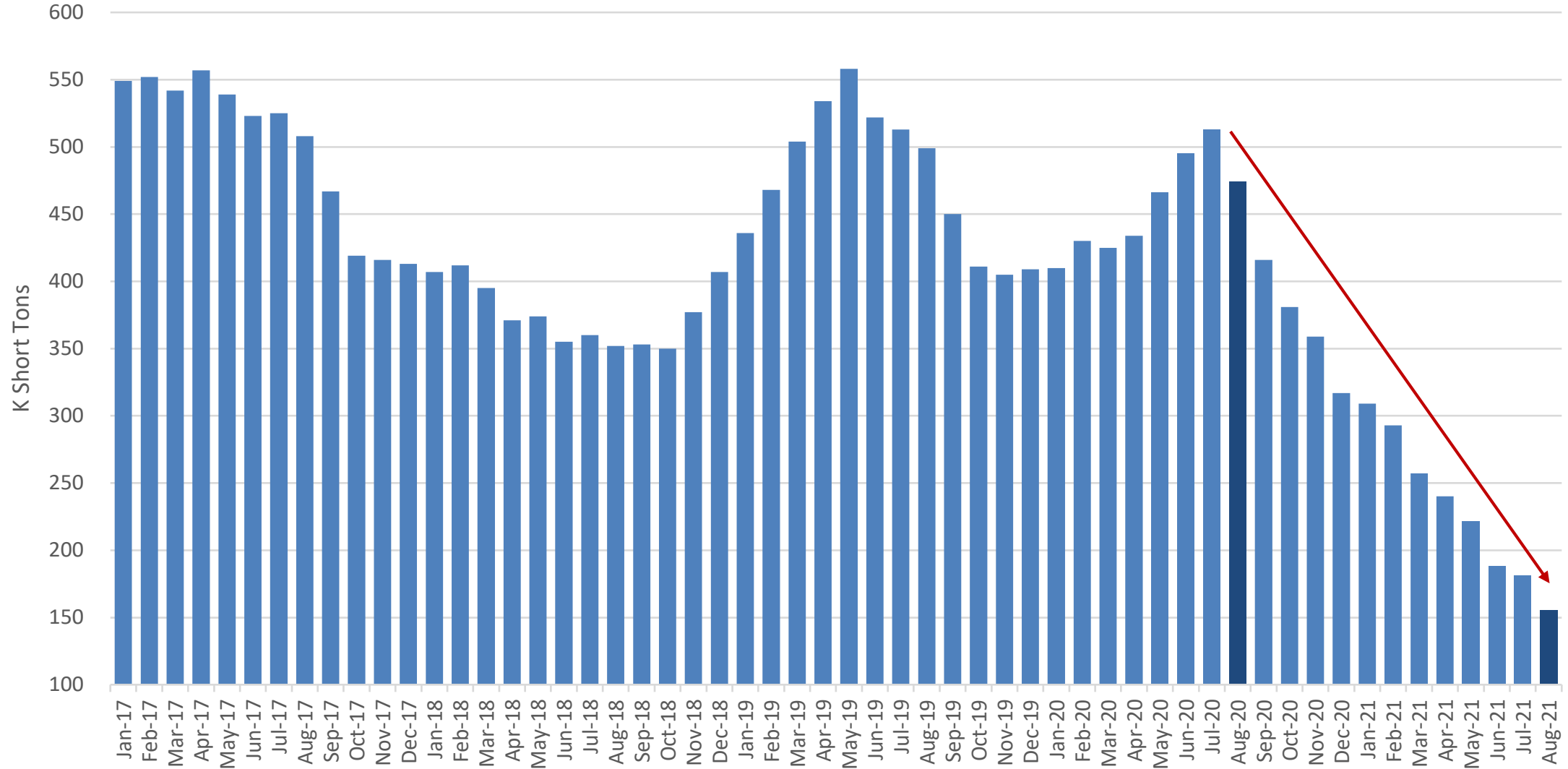


Source: RISI PPPC

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%
Total	2,720,000	100%

January 2021

COATED
GROUNDWOOD

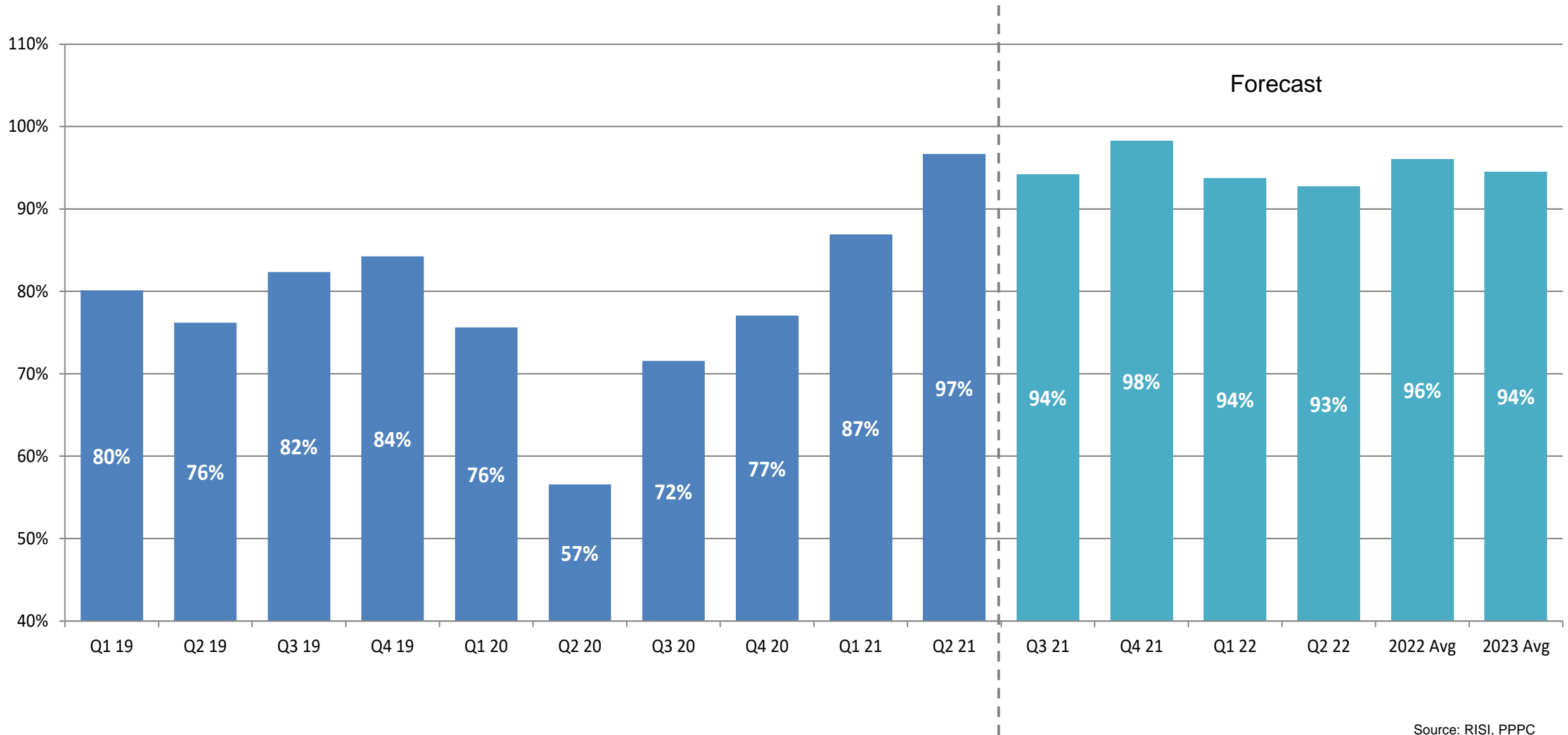
Company	~ Volume (tons)	Market Share
ND Paper *	385,000	23.3%
Verso Corp.	315,000	19.1%
Kruger	275,000	16.7%
UPM	265,000	16.1%
Catalyst (Paper Excellence)	231,000	14.0%
Evergreen Packaging	180,000	10.9%
Resolute Forest Products	0	
Total	1,651,000	100%

- 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)
- New Indy Catawba Machine Conversion (May 2020)

Evergreen discontinued their TruSpec CGW grades as of Q4 2021

* 46% less volume (when including the Evergreen shutdown)

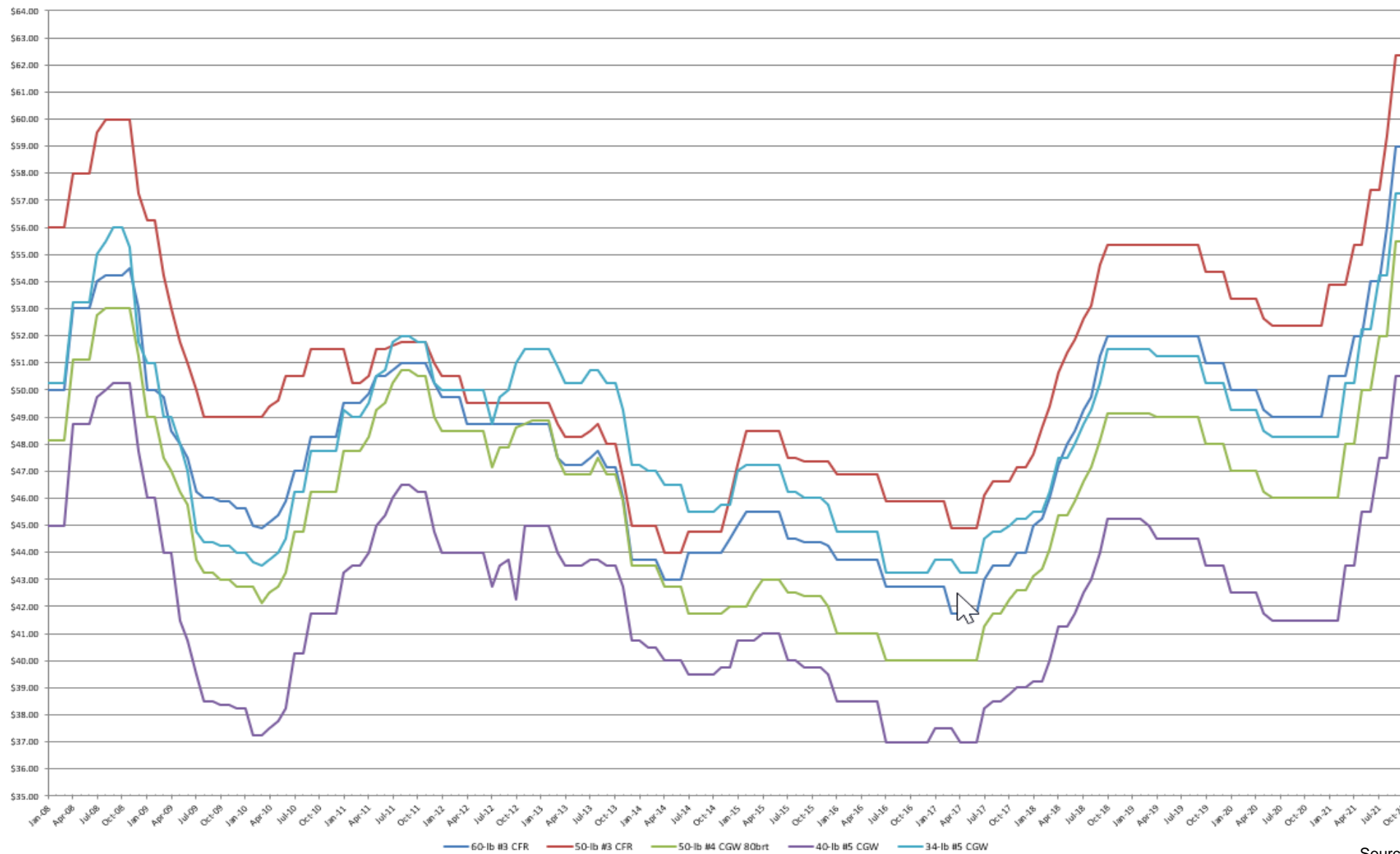
U.S. COATED GROUNDWOOD MILL OPERATING RATE FORECAST



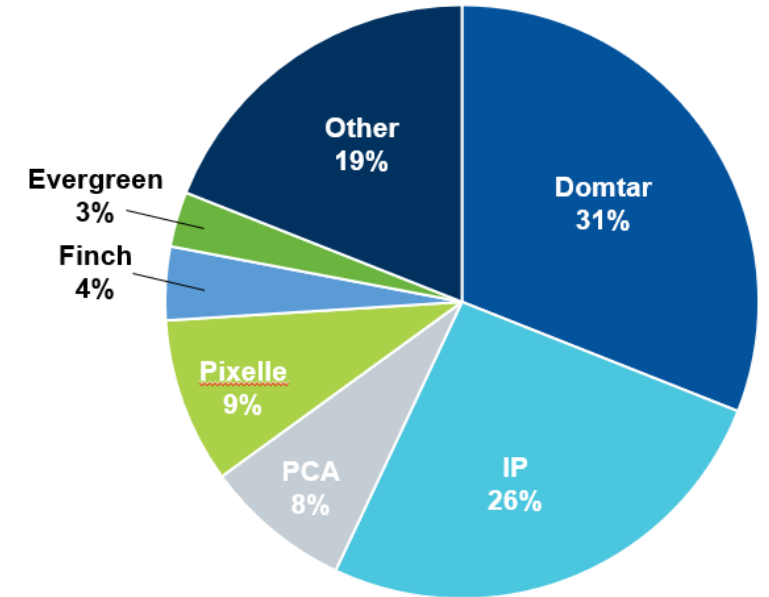
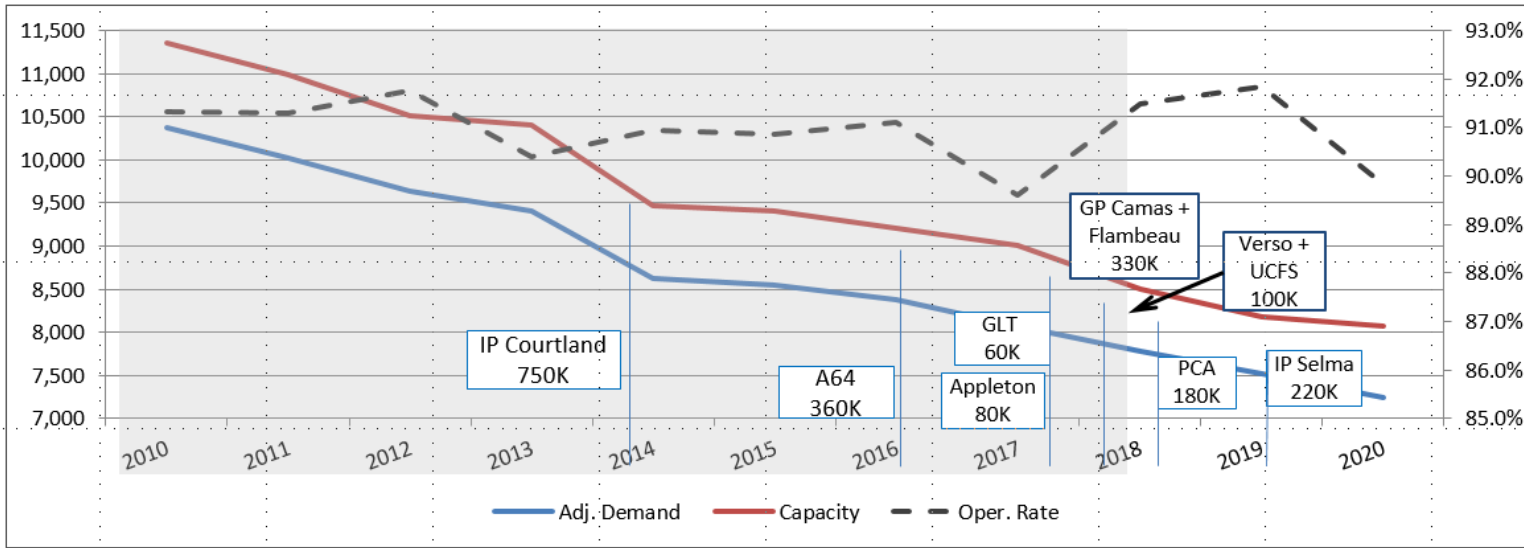
HISTORICAL COATED MARKET PRICING (2008 – 2021)



Coated Papers



SIGNIFICANT UNCOATED FREESHEET CAPACITY REDUCTION



TPY: 6,820,000

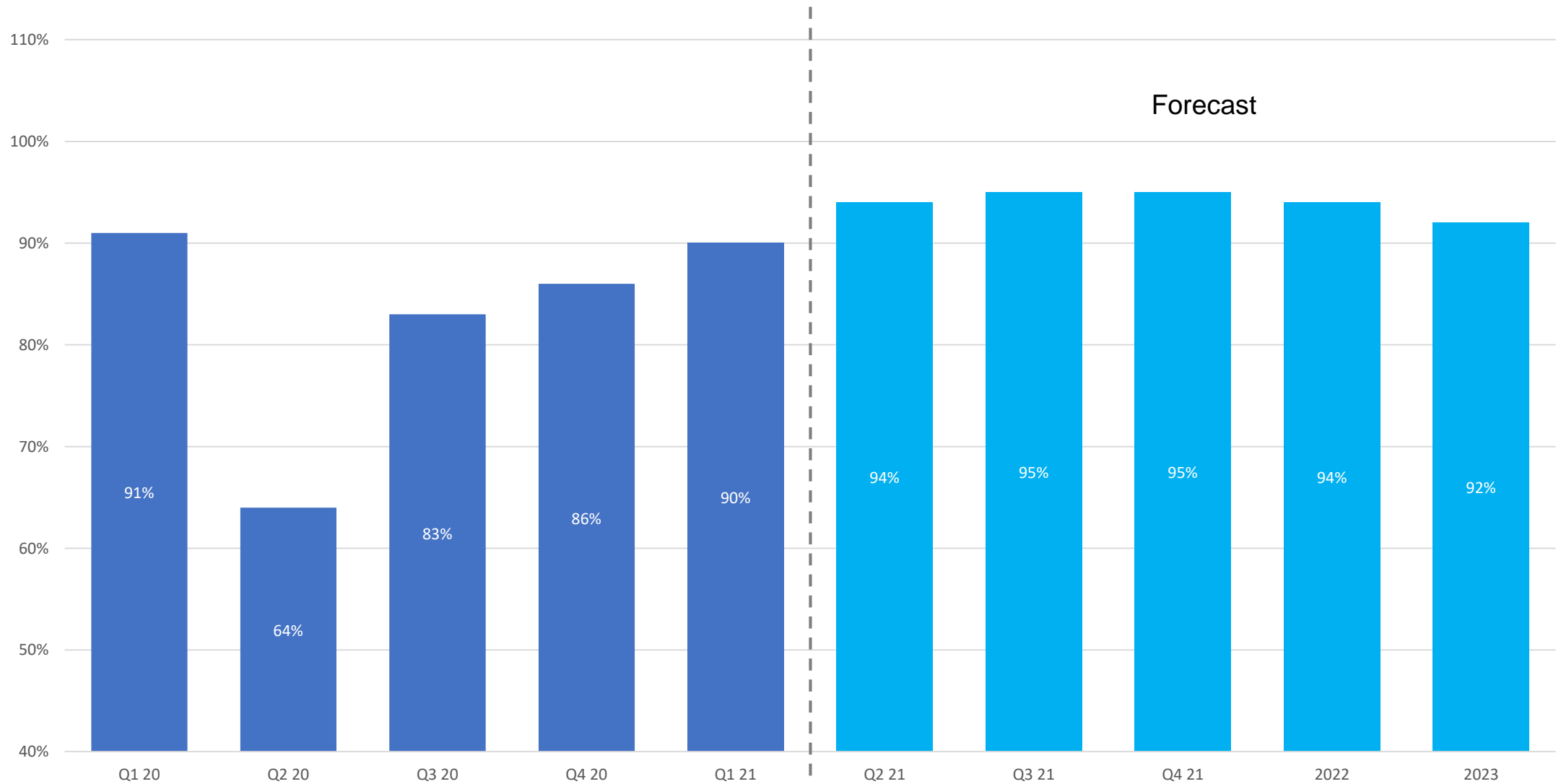
Date	Mill Name	Mill Location	Comments	Tons (.000)
Jan '18	Flambeau River	Park Falls, WI	Perm. shutdown PM# 3	-100
Jan '18	Appleton Coated (Midwest Paper)	Combined Locks, WI	Restart PM# 6 to produce CWF & UWF	50
May '18	Georgia Pacific	Camas, WA	Perm. shutdown PM# 20	-235
May '18	PCA	Wallula, WA	Conversion 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

Date	Mill Name	Mill Location	Comments	Tons (.000)*
Jan '20	International Paper	Riverdale, AL	Conv. of PM #15 to containerboard	-235
May '20	Neenah	Neenah, WI	Indefinitely Idled PM# 3	-18
Aug '20	Domtar	Ashdown, AR	PM #62 Conversion to Pulp	-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 close. Business sold to Pixelle Specialty Solutions	-120
April '21	Midwest Paper	Combined Locks, WI	Conversion to containerboard	-50

Please note this only includes publicly announced capacity changes.

One recent bright spot is the restart of the Domtar Ashdown mill adding 185,000 tons of UFS capacity back.

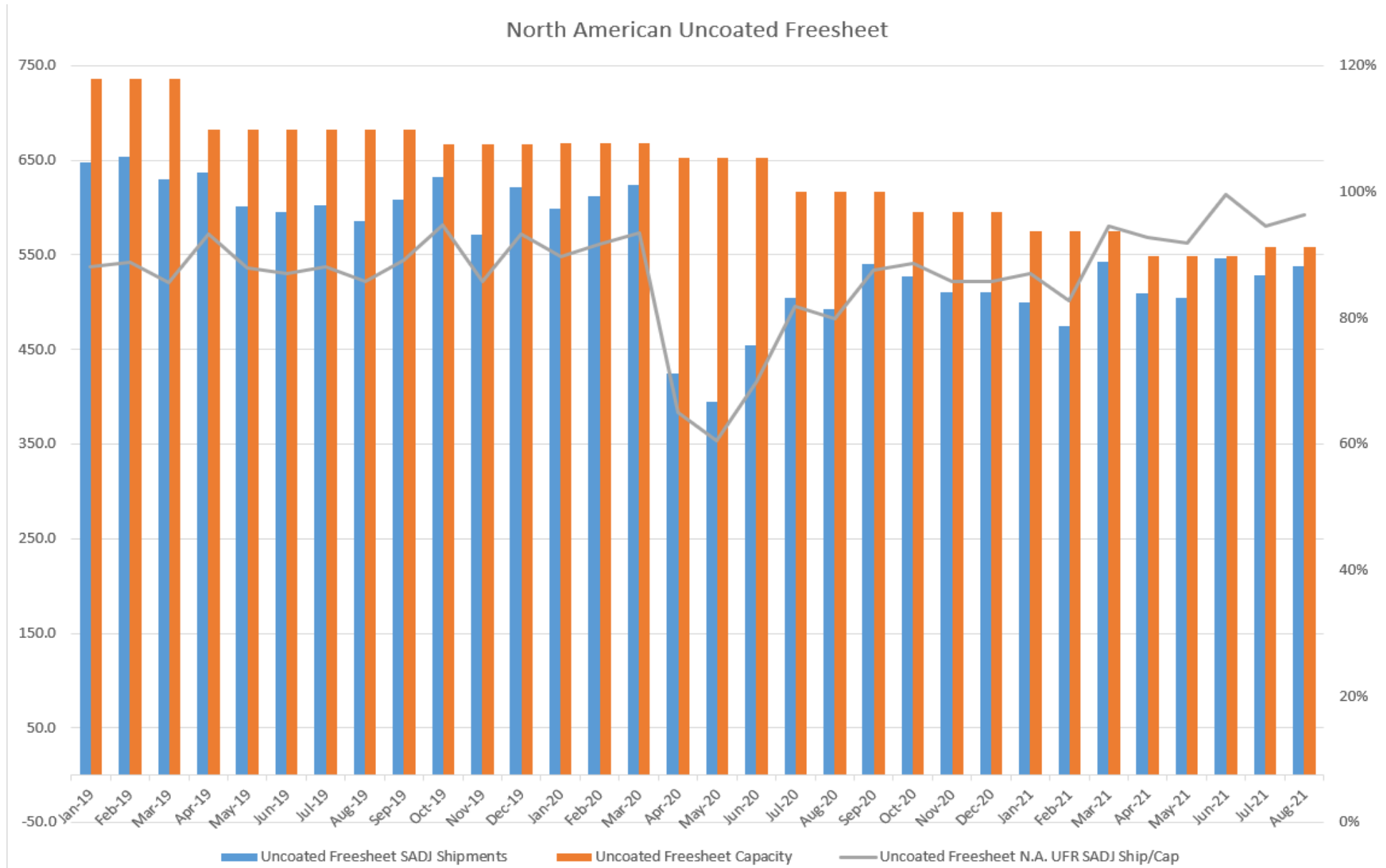
U.S. UNCOATED FREESHEET MILL OPERATING RATE FORECAST



* Includes Bristol and Cotton

Source: RISI PPPC

N.A. UNCOATED FREESHEET MILL OPERATING RATES



UNCOATED FREESHEET HIGHLIGHTS



N.A. DEMAND* (TONS,000)

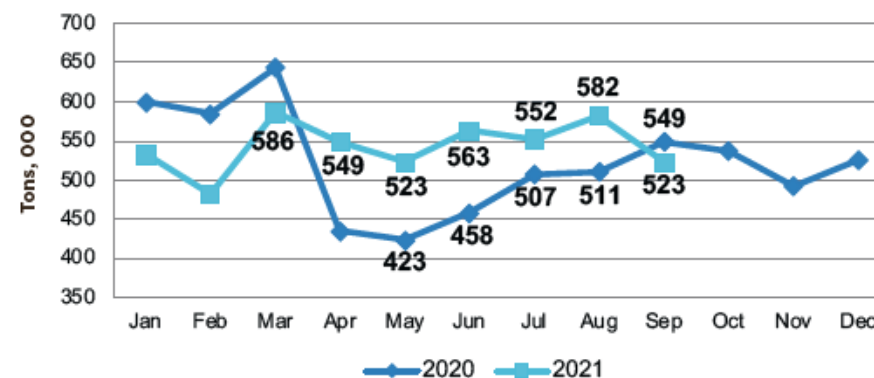
YTD UFS demand is up 4% over 2020. September 2021 demand finished down 5% versus September 2020, as commercial and transactional print continues to be strong.

Product Cat.	Sept-21	Sept-20	YOY Sept Var	YOY Sept Var %	YTD 2021	YTD 2020	YTD Sept Var	YTD Var %
Cut Size	197	212	-15	-7%	1,907	1,902	5	0%
Offset Opaques	178	185	-7	-4%	1,542	1,434	108	8%
Envelope	54	61	-7	-11%	543	527	16	3%
Forms	28	30	-2	-7%	280	292	-12	-4%
All Other	67	61	6	10%	620	556	64	12%
Total UFS	523	549	-26	-5%	4,893	4,712	181	4%

*September Imports are estimated

N.A. DEMAND*

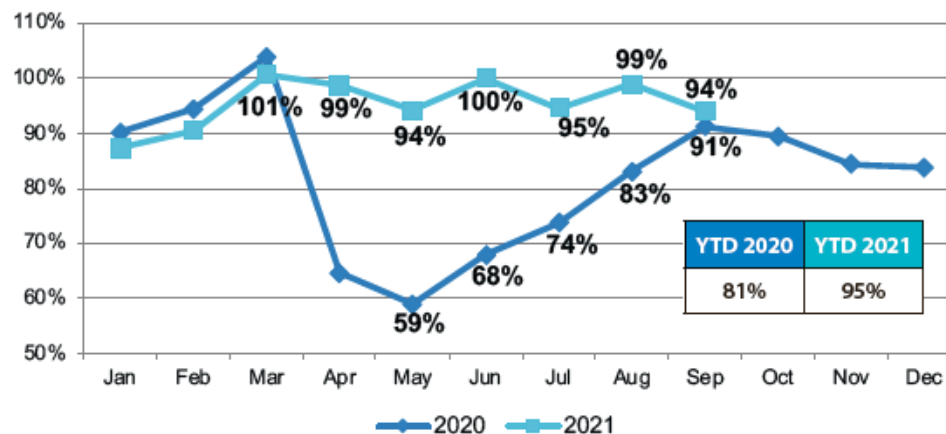
September 2021 demand ended down 10% (-59K tons) versus August 2021, while order books remain full.



*September Imports are estimated

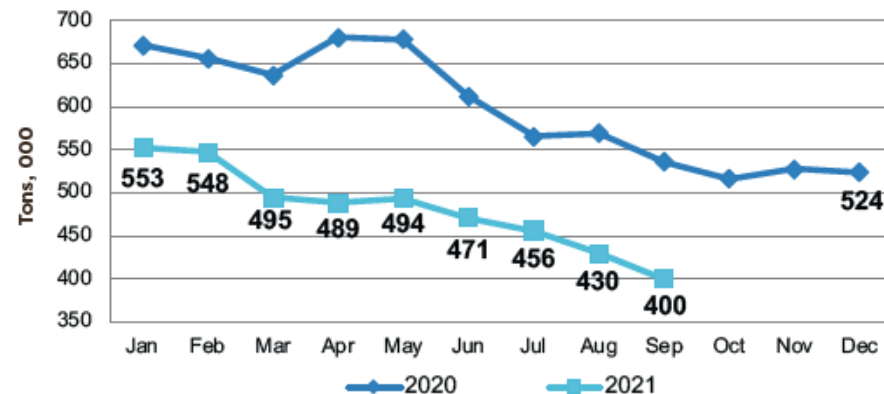
N.A. MANUFACTURERS' SHIP TO CAPACITY RATIO

September 2021 shipment to capacity ratio at 94% is 3% higher than September 2020 and is 5% lower than August 2021.



N.A. UFS INVENTORY

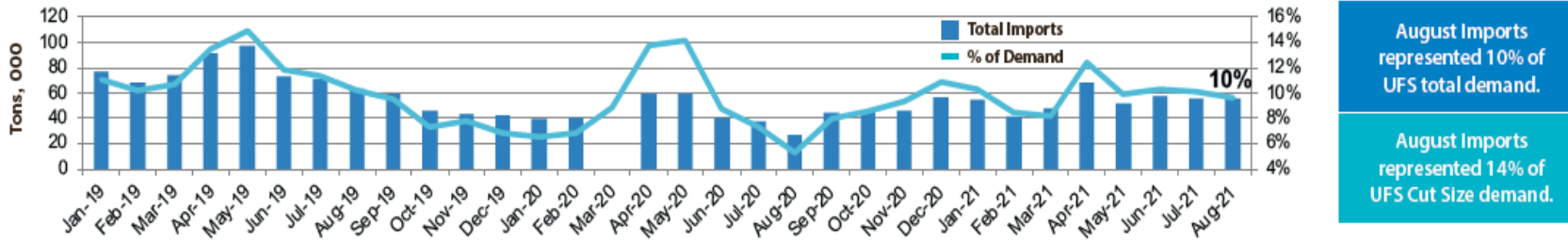
September N.A. Manufacturers' inventories decreased by 30K tons over August 2021. September inventories resulted in 24 days of supply which is 3 days lower than August 2021.



N.A. UNCOATED FREESHEET IMPORT TRENDS

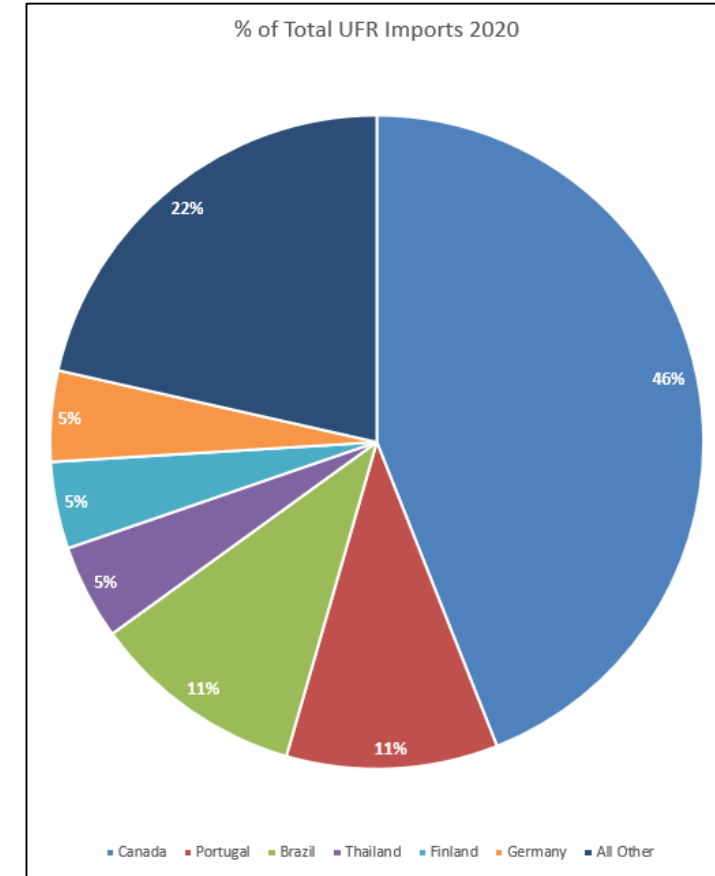
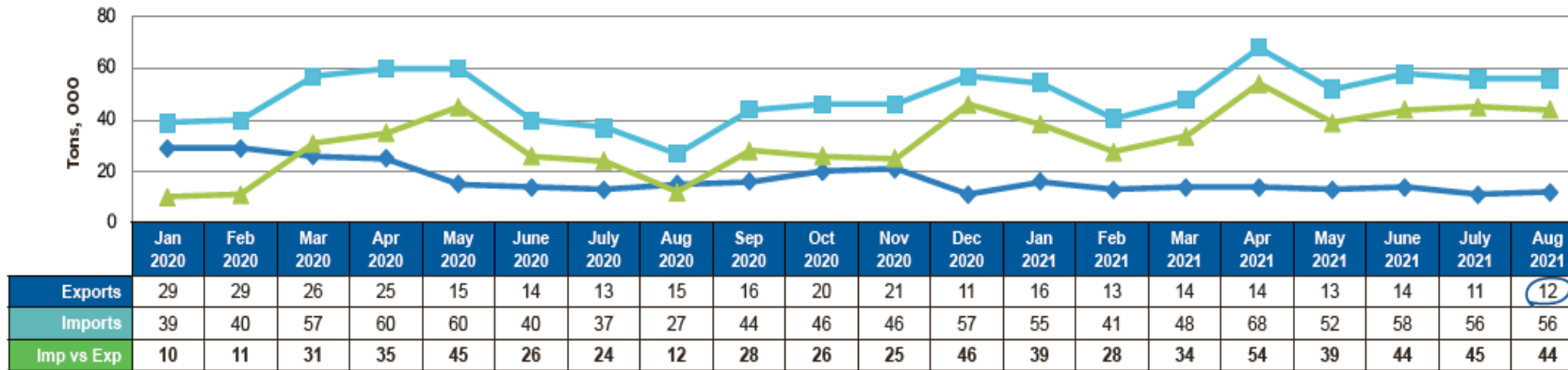


IMPORTS VERSUS N.A. TOTAL DEMAND



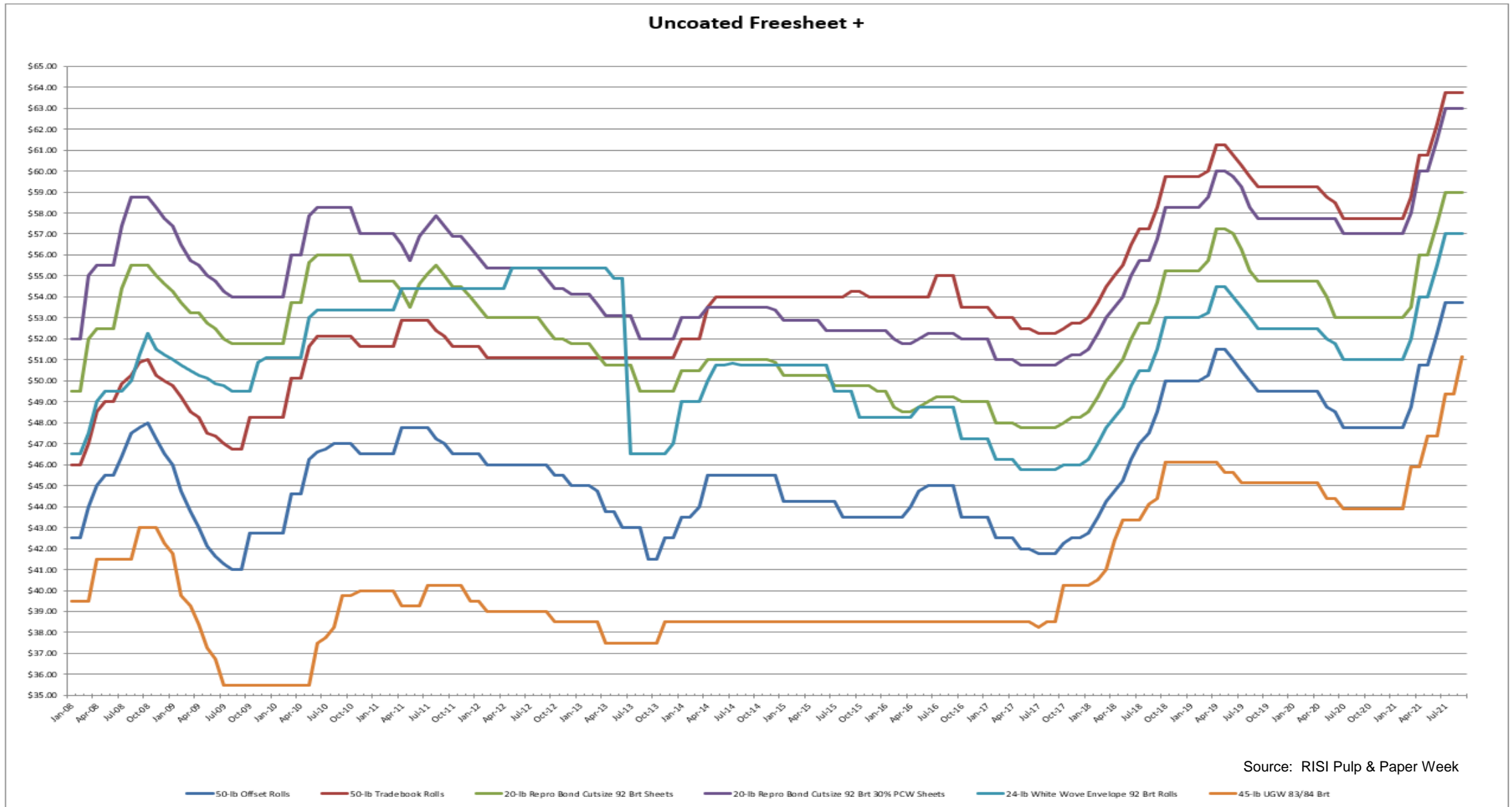
N.A. TRADE BALANCE (TONS,000)

August Trade balance was favorable to imports at +44K tons. Exports remain extremely low at 12K tons for August 2020 and import were flat at 56K tons.



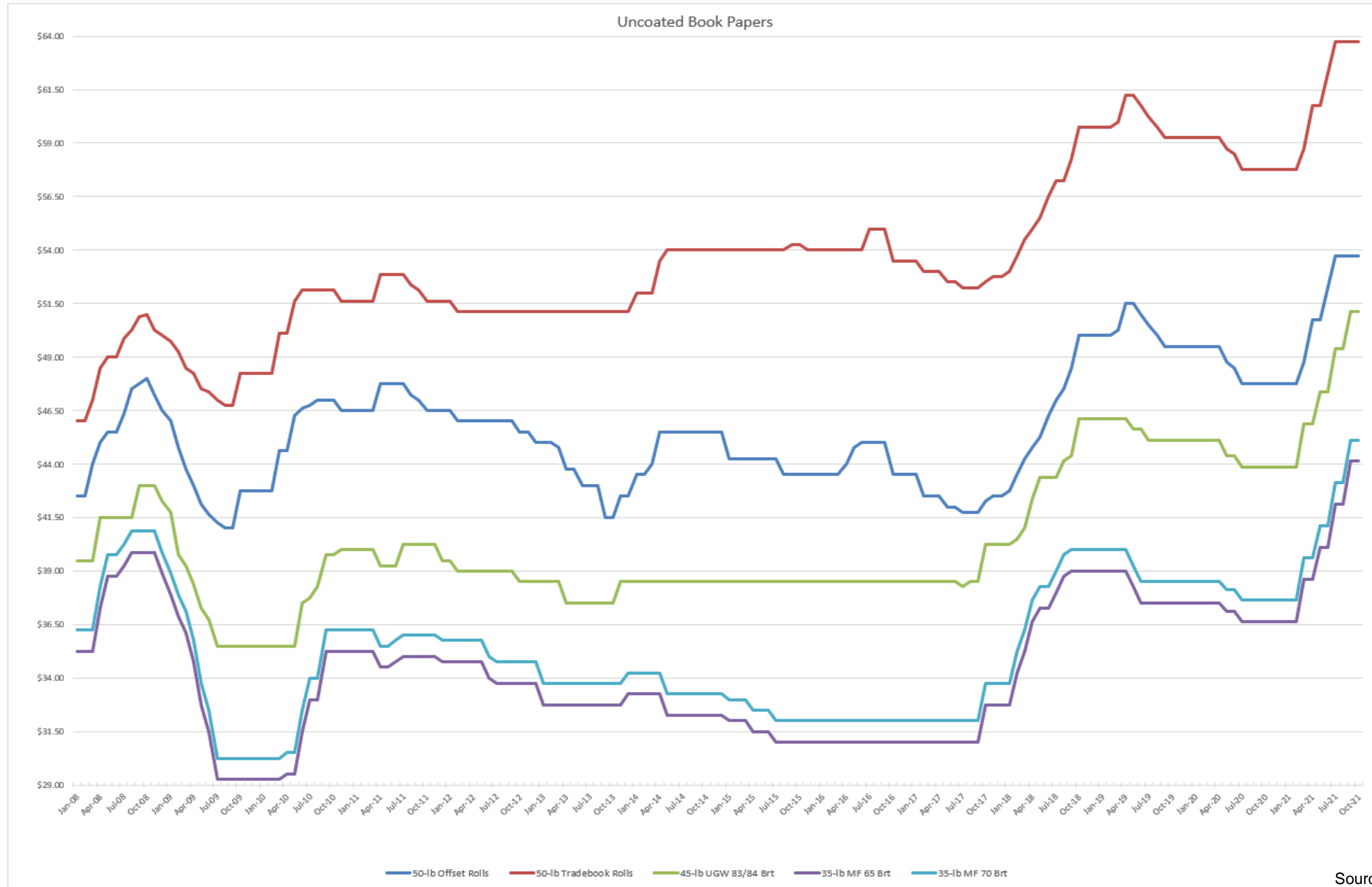
- September 2021 UFS demand finished down 5% (- 26K tons) versus September 2020
- September 2021 shipments versus capacity at 94% is 3% higher than September 2020

HISTORICAL UNCOATED FREESHEET MARKET PRICING (2008 – 2021)



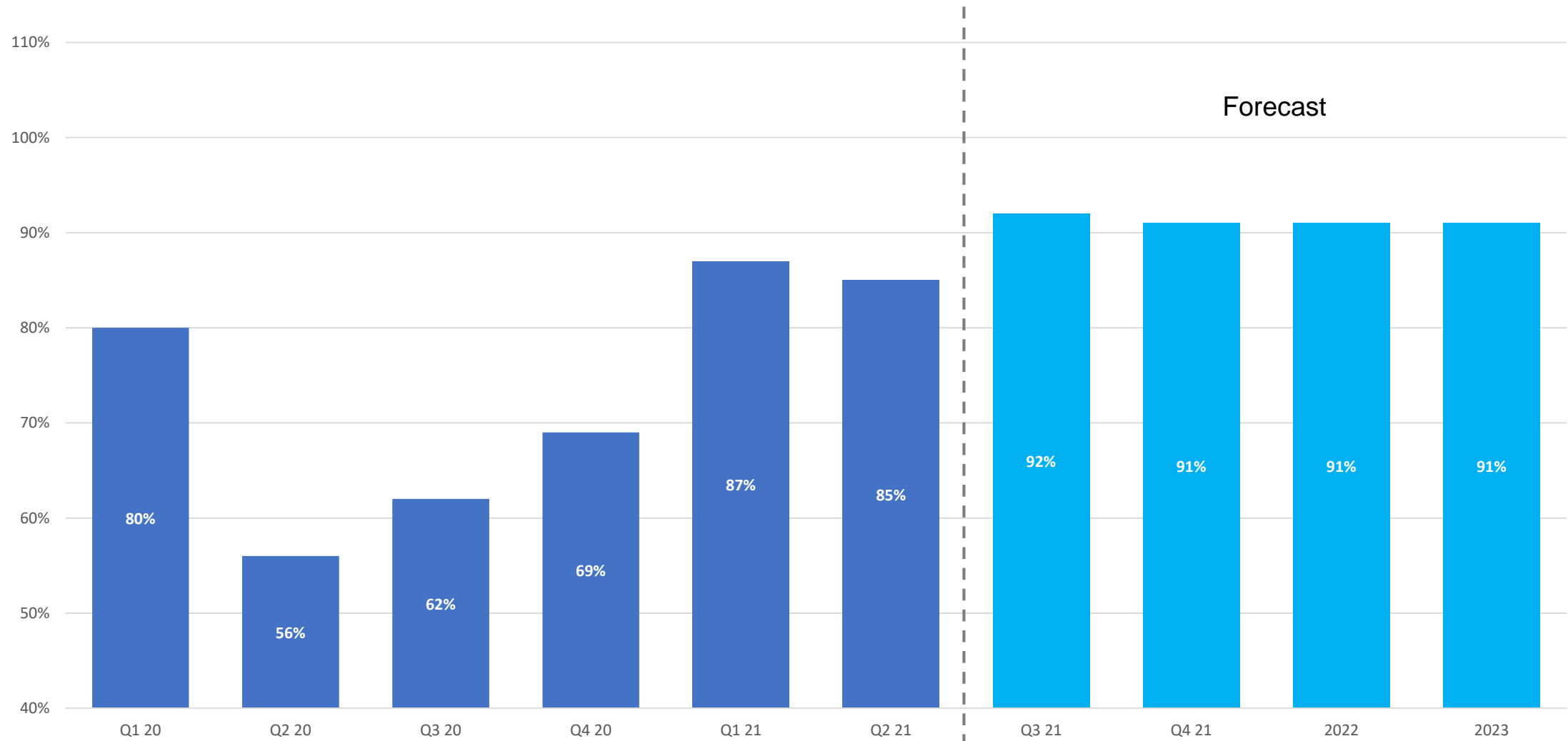
Source: RISI Pulp & Paper Week

HISTORICAL UNCOATED BOOK PAPERS MARKET PRICING (2008 – 2021)



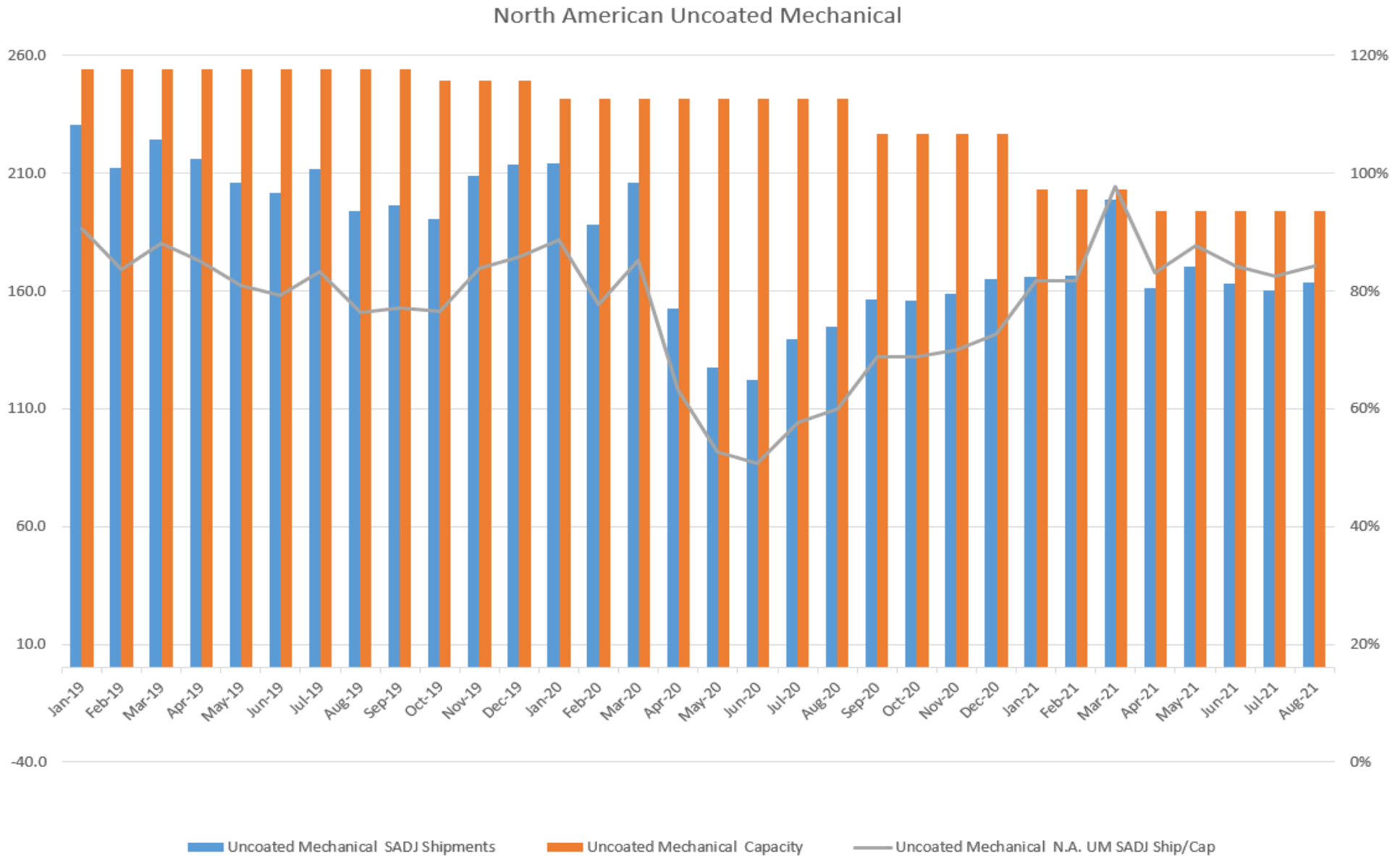
Source: RISI Pulp & Paper Week

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

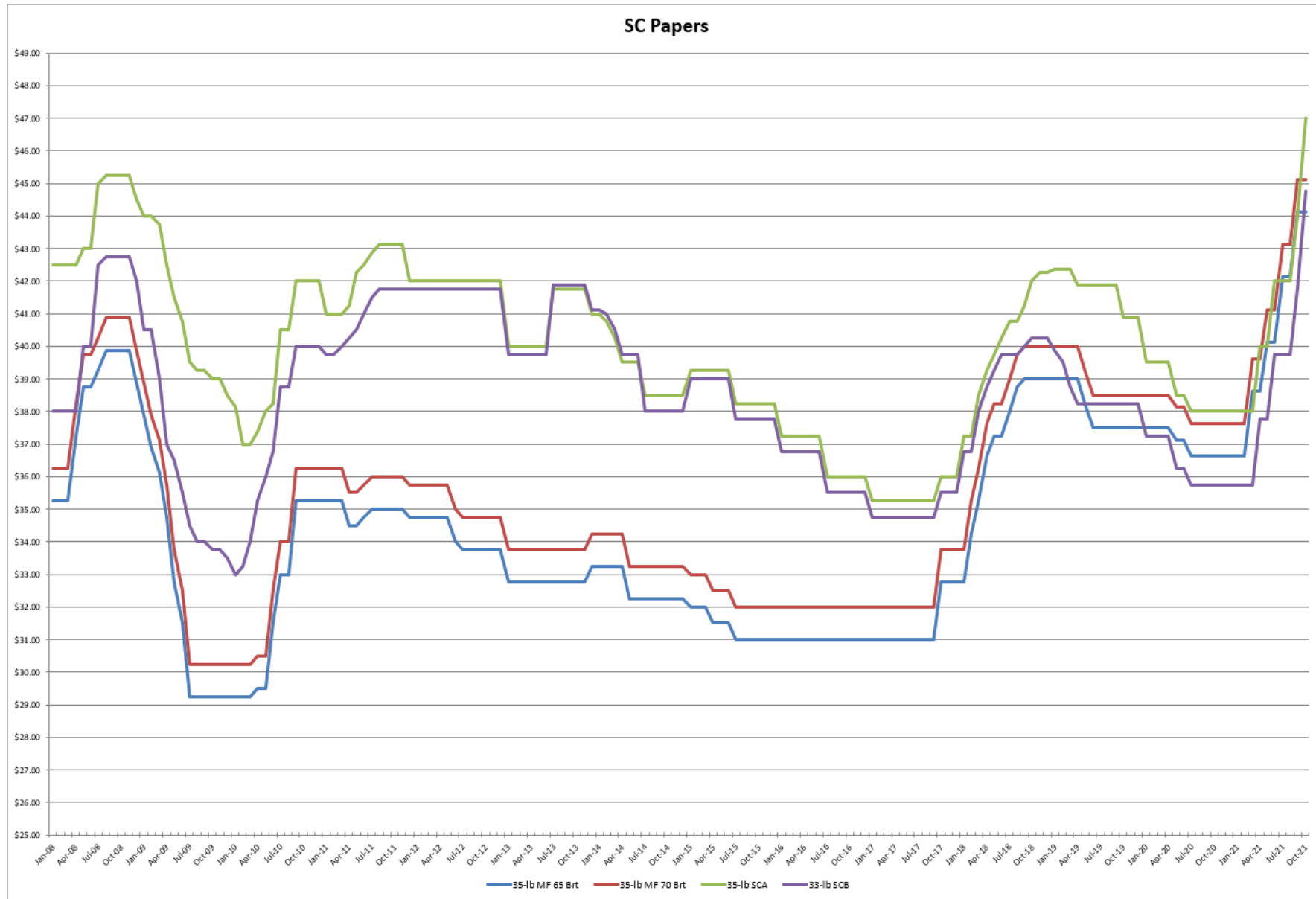


Company	Location	Annual Net Change (Short Tons)	SC Papers		
			Effective Date	Segment	Comments
St. Mary's Paper	Sault Ste, Marie, Ontario	(145,000)	Mar-11	SC	indefinite shut
New Page	Port Hawkesbury, Nova Scotia	(396,000)	Sep-11	SC	indefinite shut
Verso	Sartell, MN	(103,000)	Dec-11	SC	permanent shut 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 53
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 PM 1
Norske Skog	Saugbrugs, Norway	(110,000)	Q4-2020	SC	Shutdown PM 5
Stora Enso	Kvamsveden, Sweden	(565,000)	Sep-21	SC	Mill shuttered
	net change	(3,145,000)			

Per RISI - At Risk assets - Norske Skog Saugbrugs - 485,000 MTPY SC on 3 machines - 2 of which are proper size to convert to containerboard (Oct 2020)

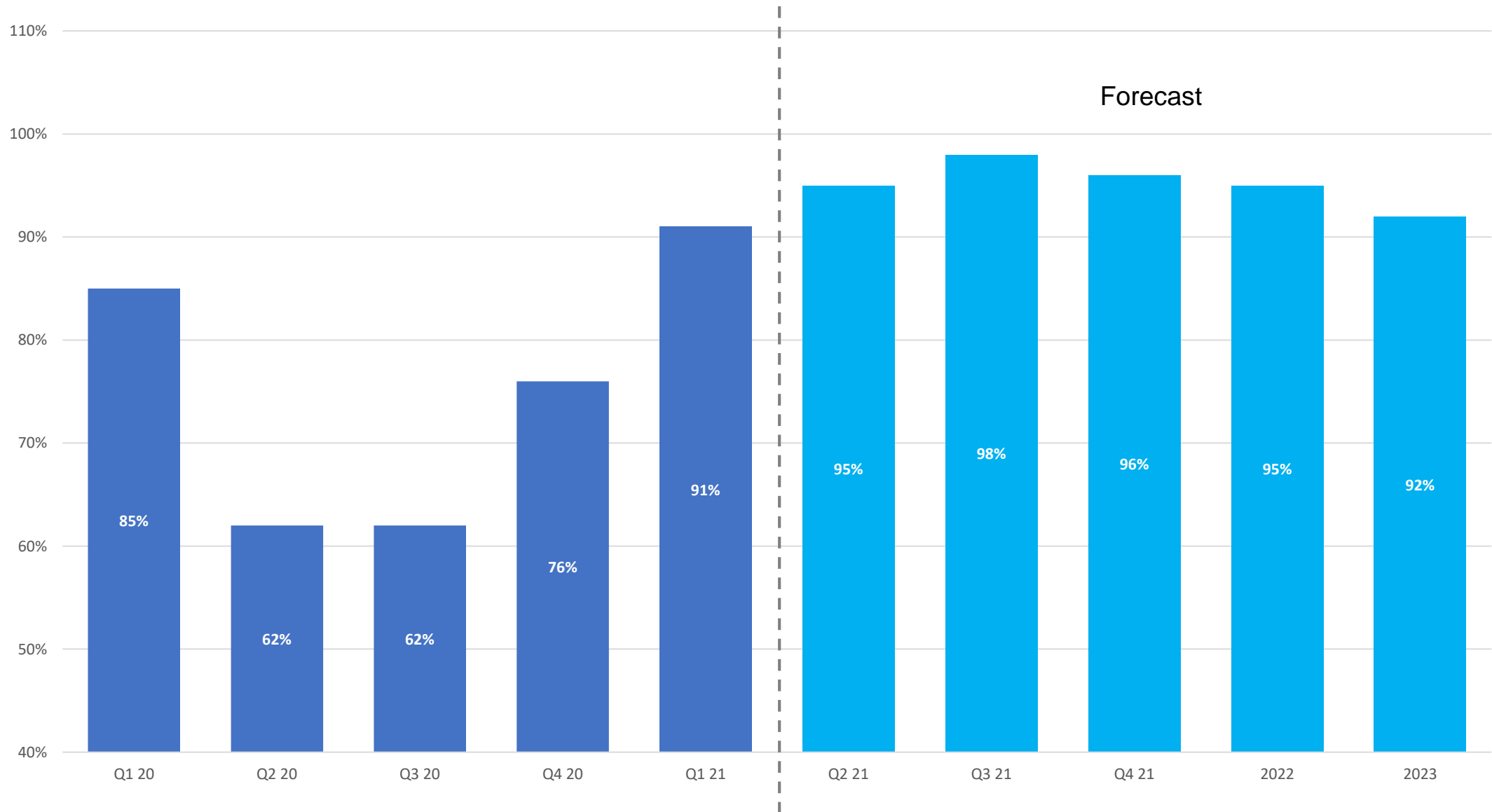
- Verso shuts Duluth, MN mill.
- Norske Skog permanently ceased production of one SC Machine in Saugbrugs, Norway.
- SCA Ortviken Sweden announced a mill conversion of one SC machine and discontinued production of publication paper.
- Stora Enso permanently closes down Kvamsveden mill in Sweden.

HISTORICAL SC MARKET PRICING (2008 – 2021)

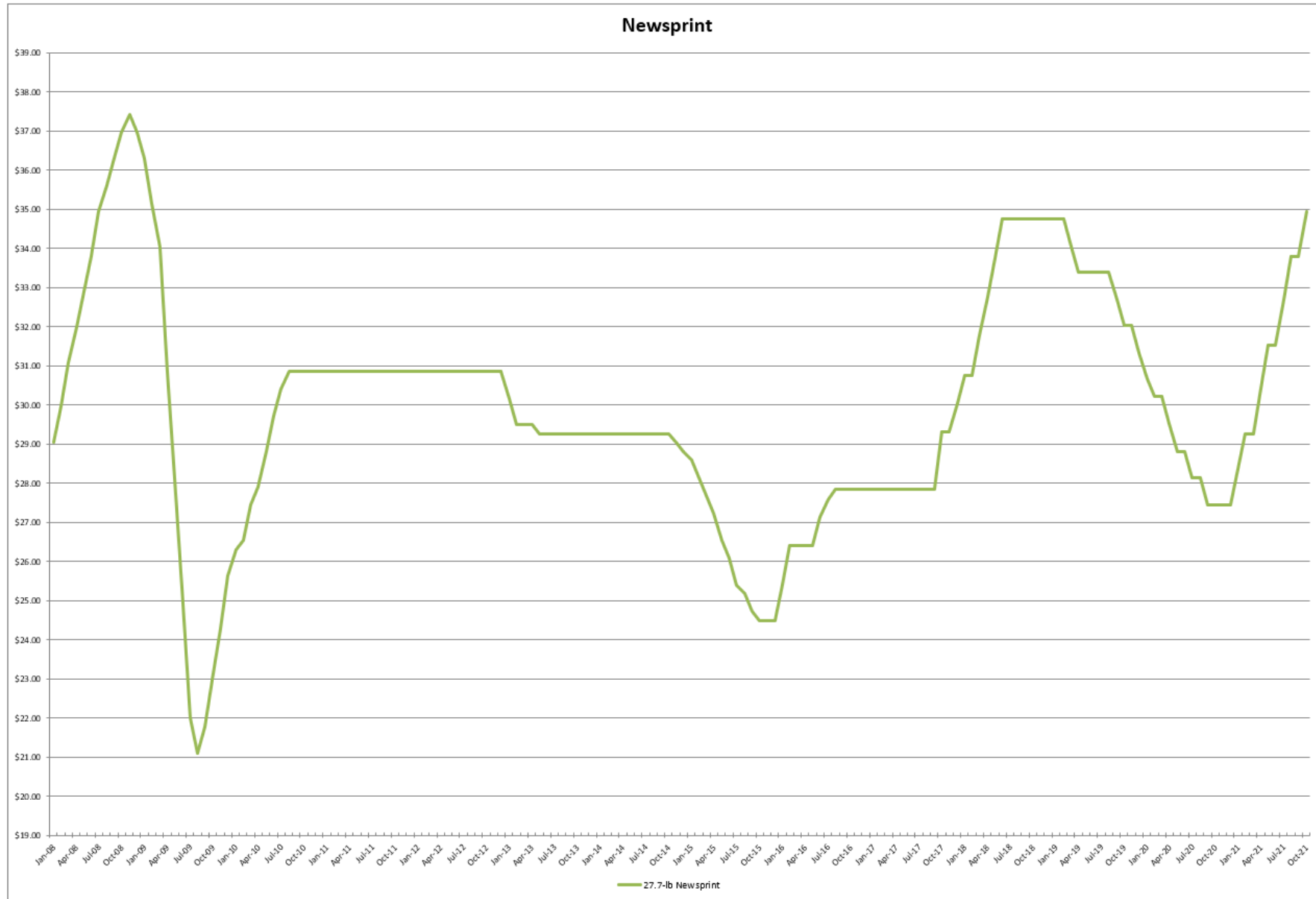


Source: RISI Pulp & Paper Week

N.A. NEWSPRINT MILL OPERATING RATE FORECAST



HISTORICAL NEWSPRINT MARKET PRICING (2008 – 2021)



Source: RISI Pulp & Paper Week

Will high pulp prices lead to additional permanent mill capacity reduction / conversion?

Will more mills move away from unprofitable grades and basis weights in this tight market?

What plans does Paper Excellence have for Domtar?

What would an Atlas Holdings acquisition of Verso mean for the Wisconsin Rapids mill?

What transpires with book printing and binding capacity?

How does the trend toward carbon reduction affect the paper and print industry?

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PAPER COMPANY.**

**WE'RE A BAND OF
PROBLEM SOLVERS.**

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