Fastmarkets

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North American

Woodfiber & Biomass Markets

UNDERSTANDING THE KEY DRIVERS OF NORTH AMERICAN WOODFIBER AND BIOMASS MARKETS

South Atlantic struggles persist; salvage, shuts old news; now quotas, tariffs, confusion dominate

Broad-ranging storm damage and awkward recovery dominate forest industry talk across the South Atlantic region in early April, long after a bad hurricane late last summer slammed a path of damage from Florida through the mid-Atlantic and on to eastern Canada.

Relatedly, fourth quarter pine pulpwood prices briefly spiked $10-20/ton for prompt delivery as mills ran short, only to see prices fall soon thereafter. Since then, the last few months have seen "near zero" stumpage offerings of unaffected, or "clean," tracts, with landowners "effectively forcing" loggers onto damaged tracts for months since, rushing for recovery before degradation sets in on ››› *continued on page 2*

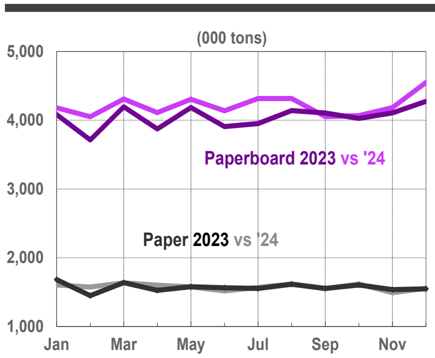
Northeast wood inventories on target, tariff uncertainty causes jitters

A strong winter logging season wrapped up recently in the Northeast region, and harvest operations are throttled back for breakup. Consuming mills reported solid inventories in early spring. Delivered wood pricing showed low volatility.

"We have a very large inventory and had to curtail buying," a wood procurement manager in Maine said. "Everyone is full."

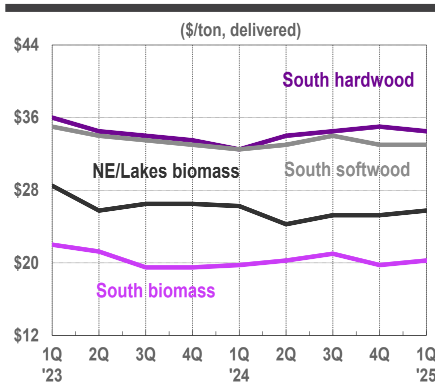
To the south, a wood buyer in Pennsylvania said, "We got into breakup and the woods dried out faster than I thought they ››› *continued on page 4*

US paper & board production



Source: AF&PA.
Pulp and paper consumes 82% of US woodfiber currentlly, the remainder by bioenergy and OSB

US roundwood & biomass prices



Source: RISI.

In this issue:

South Atlantic struggles perist…

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imminent warmer weather. Damaged sawtimber and chip 'n' saw volumes are selling at steep discounts, much of it delivered to pulpmills "just to clean up" for replanting, said a forester. "It's a mess," summed another.

Altogether, first quarter pulpwood prices were generally flat, despite the turmoil. And "quotas, quotas, everywhere."

Prices level. South Atlantic pine roundwood maintained its usual wide price spread in first quarter, unchanged from the prior quarter: Highest in the highly competitive Coastal area at $40/ton delivered, lowest in the Northside at $33/ton, and $36/ton in the middle, the Southside area.

Hardwood pulpwood pricing barely merits mention anymore for much of the South as mills use less and less of the stuff, panned for unreliable supply, excess species mix and lost share to recovered fiber. That said, first quarter hardwood pulpwood was mostly unchanged in price, ranging in the mid-to-upper $30s/ton delivered.

Oops! And then, just in recent days as second quarter opened, US trade tariff impacts emerged, nearly all negative, some potentially devastating. Export-heavy mills reported cancelled pulp, paper, and packaging orders last week and lasting into the "unknown" future. Once the warehouses fill up, "expect to see downtime."

Who's next? Meanwhile, talk returned surrounding "the next pulp mill to drop," contacts noted, after earlier moves on IP's mill closures in Georgetown, SC, and Campti, LA (*WBM*, March, Feb, p. 2). IP is said to be in the process of selling its market and specialty pulp division. A subsequent closure is possible, often common in takeovers.

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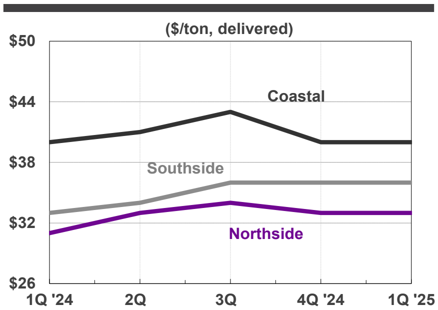
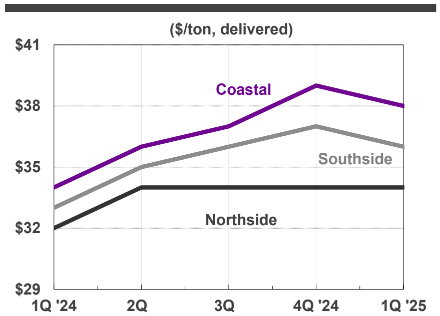
South Atlantic pine roundwood prices



Source: NAWBM

South Atlantic hardwood roundwood prices



Source: NAWBM

South Atlantic region woodfiber prices

NORTHSIDE (VA, NC)

$/ton	1Q 2025	4Q 2024	3Q 2024	2Q 2024	1Q 2024	% chg 2025/24
Roundwood (delivered)						
Pine	$33	33	34	33	32	3%
Hardwood	$34	34	34	34	32	6%
Sawmill chips (FOB supplier)						
Pine	$26	26	26	26	27	-4%
Hardwood	$30	30	29	29	28	7%
Chip mill chips (FOB supplier)						
Pine	$39	38	38	37	35	11%
Hardwood	$41	40	39	38	36	14%

SOUTHSIDE (Inland GA, SC)

$/ton	1Q 2025	4Q 2024	3Q 2024	2Q 2024	1Q 2024	% chg 2025/24
Roundwood (delivered)						
Pine	$36	36	36	34	33	9%
Hardwood	$36	37	36	35	33	9%
Sawmill chips (FOB supplier)						
Pine	$26	26	26	26	27	-4%
Hardwood	$30	30	29	29	29	3%
Chip mill chips (FOB supplier)						
Pine	$43	41	40	39	37	16%
Hardwood	$43	41	39	38	36	19%

COASTAL (GA, SC, FL)

$/ton	1Q 2025	4Q 2024	3Q 2024	2Q 2024	1Q 2024	% chg 2025/24
Roundwood (delivered)						
Pine	$40	40	43	41	40	0%
Hardwood	$39	39	37	36	34	15%
Sawmill chips (FOB supplier)						
Pine	$28	28	28	28	29	-3%
Hardwood	$31	31	29	28	27	15%
Chip mill chips (FOB supplier)						
Pine	$47	46	44	44	43	9%
Hardwood	$44	42	40	40	38	16%

$/green ton. Estimated delivered-mill average open market price over the quarter.

North American woodfiber prices

Comparative North American regional hardwood roundwood

US$/green ton	1Q 2025	4Q 2024	3Q 2024	2Q 2024	1Q 2024	% change 2025/24
US South Atlantic	$36	37	36	35	33	9%
US South Central	$33	33	33	33	32	3%
US Northeast	$51	50	53	51	52	-2%
US Lake States	$44	45	45	45	45	-2%

Hardwood roundwood, excludes woodchips. Estimated region-wide market average price, delivered mill.

Comparative North American regional softwood roundwood

US$/green ton	1Q 2025	4Q 2024	3Q 2024	2Q 2024	1Q 2024	% change 2025/24
US South Atlantic	$36	36	38	36	35	3%
US South Central	$30	30	30	30	30	0%
US Northeast	$51	53	52	53	53	-4%
US Lake States	$47	46	45	46	45	4%
US Pacific Northwest	$30	30	29	29	29	3%
British Columbia	$36	36	36	36	34	6%

Softwood roundwood, excludes woodchips. Estimated region-wide domestic market average price, delivered mill.
Canadian fiber prices, reported in US$, effected by variable exchange rates.

Comparative North American regional hardwood chips

US$/green ton	1Q 2025	4Q 2024	3Q 2024	2Q 2024	1Q 2024	% change 2025/24
US South Atlantic	$48	46	45	44	42	14%
US South Central	$44	43	43	43	41	7%
US Northeast	$48	50	48	48	50	-4%
US Lake States	$37	38	38	37	38	-3%

Hardwood residual and manufactured chips, excludes softwood. Estimated region-wide domestic market average price, delivered mill.

Comparative North American regional softwood chips

US$/green ton	1Q 2025	4Q 2024	3Q 2024	2Q 2024	1Q 2024	% change 2025/24
US South Atlantic	$46	45	44	44	43	7%
US South Central	$40	39	40	39	39	3%
US Northeast (excluding spruce/fir)	$52	52	50	50	49	6%
US Pacific Northwest [1]	$45	45	41	41	41	10%
British Columbia	$47	47	48	49	48	-2%

Softwood residual and manufactured chips, except 1 Pacific Northwest, residual chips only. Estimated region-wide domestic market average price, delivered mill. Canadian fiber prices, reported in US$, effected by variable exchange rates.

DISCLAIMER: While the information contained in this table has been obtained from sources believed to be reliable, RISI does not warrant or guarantee the accuracy and completeness of the information. Actual transaction prices may vary.

Northeast woodfiber inventories on target…

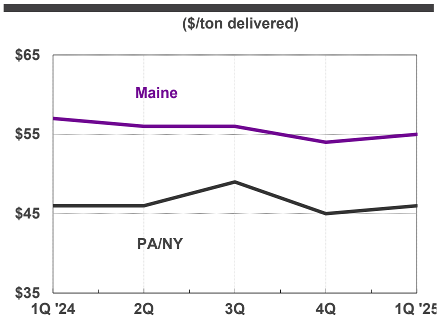
››› continued from page 1

would. Now the wood is flowing again, and I'm not worried. Plus, we had a lot of wood going into winter."

The only issue during the winter, according to sources, was a few bouts of severe cold. "It was hard on machines in the woods as well as on the fiber line at the mill dealing with frozen chips," said a pulp and paper mill contact.

But for wood pellet producers in the region, the deep cold was a godsend after a series of warm winters cooled heating markets. A pellet source said the season was the "coldest since 2014, which was good for sales and bodes well for mills going into next year." Another added, "The cold did help, but we still have a lot of product in the pipeline."

US Northeast hardwood roundwood prices



Source: NAWBM

Tariff uncertainty. Looming in the background, almost all sources mentioned the erratic Trump tariffs and the "uncertainty" their implementation is foisting on the economy. A fiber manager said, "I believe there will be significant impacts. There are weak elements of our supply chains that can't take much pressure."

And the closer you get to the Canadian border, the deeper the concern over tariffs. "There are lumber producers I deal with that have operations on both sides of the border," a contact said, "and they will get hurt."

A paper producer said tariff uncertainty already caused orders to be canceled. "And for the loggers, log exports to China have dried up" as a result of the brewing trade war.

Fiber prices relatively stable. At the end of first quarter, hardwood roundwood averaged $55/green ton delivered in Maine, up $1/ton from fourth quarter and down $2/ton from a year ago. In Pennsylvania/New York, hardwood roundwood averaged $46/ton during first quarter, up $1/ton from last quarter and sideways from first quarter, 2024.

Hardwood sawmill residual chips in Maine averaged $50/green ton delivered for first quarter, unchanged from fourth quarter and down $5/ton from a year ago. In PA/NY, hardwood sawmill chips averaged $45/ton for the period, down $4/ton from fourth quarter and unchanged from first quarter, 2024. In-woods debarked hardwood chips in PA/NY ranged $57-67/ton during first quarter, down from fourth quarter on the high end of the range.

For softwood species, Maine spruce/fir roundwood averaged $45/ton delivered at the end of first quarter, down $1/ton from fourth quarter, and down $2/ton from a year ago. Softwood roundwood in PA/NY (pine and hemlock) averaged $56/ton for first quarter, down $4/ton from last quarter and down $3/ton from first quarter, 2024.

Biomass averaged $32/green ton delivered in Maine and Northern New England during first quarter, down $1/ton from fourth quarter and down $3/ton from first quarter, 2024. For PA/NY, biomass averaged $21/ton for the period,

US Northeast woodfiber prices

$/ton	1Q 2025	4Q 2024	3Q 2024	2Q 2024	1Q 2024	% chg 2025/24
Maine (delivered)						
Hardwood roundwood	55	54	56	56	57	-4%
Spruce/fir roundwood	45	46	47	45	47	-4%
Hardwood sawmill chips	50	50	50	50	55	-9%
Pennsylvania/New York (delivered)						
Softwood roundwood	56	60	57	60	59	-5%
Hardwood roundwood	46	45	49	46	46	0%
Hardwood sawmill chips	45	49	46	45	45	0%

$/green ton. Estimated average open market price over the quarter.

up $3/ton from last quarter and up $3/ton from a year ago.

Region-wide, hardwood pellet-grade feedstock averaged $44/green ton delivered for first quarter, down $1/ton from fourth quarter and up $1/ton from a year ago. Softwood pellet-grade feedstock averaged $34/ton for the period, down $2/ton from last quarter and up $1/ton from first quarter, 2024.

TimberHP bankruptcy. TimberHP, the wood-based insulation manufacturer in Madison, ME, filed for voluntary Chapter 11 bankruptcy last month. Citing inflation and supply chain issues, the company seeks to reorganize and complete construction of its third product line.

According to the company, "During the court-supervised reorganization process, business will continue as usual and without interruption, including the production and sales of its two, well received, existing product lines, TimberBatt and TimberFill."

An investor said, "They reached an agreement with debtors, but the shareholders now have nothing."

Hardwood lumber closure. Patterson Lumber, a large hardwood manufacturer in Galeton, PA, closed permanently and unexpectedly early this month. Patterson was also a roundwood pulpwood supplier to local markets, and a significant chip producer. A source said, "They were a good solid company, I don't know what happened. Over a dozen loggers were linked to that mill and maybe half will go out of business. This will cause supply chain issues."

South Atlantic struggles persist…

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Koch Brunswick? Adding to the whispers, a local source suggested "heads will roll," or worse, at the big G-P/Koch pulp complex in Brunswick, GA, after a botched engineering snafu lasting months and costing countless millions. All the while, the plant runs at a considerably reduced rate, from 375 truckloads per day to just one hundred, local sources said.

Hardwood pulpwood – don't say it. Asking for a hardwood pulpwood quota can be "like cursing in church," one Southern contact described it. Another called hardwood "a dirty word," all the while consumption falls to generational lows in the US.

Adding to those woes, International Paper is said to be "discontinuing" hardwood pulpwood purchases in and around Georgia due to switching production lines to pine-based kraft grades.

IP's new "bold" goals, suppliers duck

Largest pulpwood buyer in the US, International Paper's new CEO Andrew Silvernail laid out lofty new goals for the company recently. Silvernail's objective over three years is for IP to generate a hefty 20% profit margin, on sales between $26-28 billion and earnings of about $5.5-6.0 billion, he explained at the company's three-hour investors' day in late March. For comparison, IP's margin last year in North America was well below 20%.

The company recently completed a $7.2 billion acquisition of DS Smith, second largest woodfiber consumer in Europe with just one virgin mill in the US at Riceboro, GA.

Silvernail, barely a year on the job and seen as a "fixer," said IP is in the middle of "reconfiguring" its business. In the last year-plus, IP permanently closed two large Southern pine linerboard mills, one in Orange, TX, and one in Campti, LA. In the midst of that, IP shut its big market pulp mill in Georgetown, SC. The CEO was said to be lead driver in that downsizing.

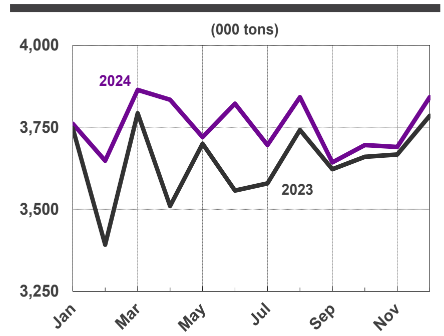
Closure of the three pulpwood mills makes more than six million tons of lost pulpwood consumption annually. And each has upset the crucial forest industry fiber balance, from forest

US paper, board & market pulp

	Oct	Nov	Dec	YTD 2023	YTD 2024	YTD v. 23
Paper Production	1,619	1,493	1,557	18,378	18,865	3%
Paperboard Production	4,068	4,184	4,355	48,366	50,346	4%
Total Production	5,687	5,678	5,912	66,745	69,211	4%
Market Pulp Shipments	623	571	619	8,101	7,537	-7%
Recovered Paper Consumption	2,712	2,727	2,782	31,291	32,967	5%

Source: AF&PA

US woodpulp production



Source: NAWBM

owners to loggers, sawmills (residuals) and investors. In the last year, the company has also closed at least seven box plants. It's all integrated, an analyst explained. "Pull out part and the whole thing is at risk."

Losers and winners. Pulpwood markets Southwide continue to evolve. Some say this latest round started with IP's shutting its Orange, TX, pine mill in 2023. Today, low-cost Southern pulpwood areas include Arkansas, Louisiana, Mississippi, and South Carolina. All have faced major losses in pulpwood demand. Higher cost areas, more or less with fewer shuts, include Alabama, Florida, Georgia, North Carolina, and Virginia.

Silvernail said the company was moving into a "customer focused" mindset, a lower cost position and a high "customer excellence," whatever that means. A former wood supplier claimed there was "no more juice left to squeeze" out of pulpwood costs, already at decades-lows, inflation adjusted.

Two dominate. In North America, IP's packaging business has about a 30% market share with Smurfit Westrock second largest with about a 20% share.

Biomass Focus

IP's shuttered SC mill may become biomass power plant and industrial site

A state senator in South Carolina claims that the recently shuttered **International Paper** mill in Georgetown will become a wood-fired power plant and industrial campus. However, no details were provided.

The mill closed at the end of last year, leaving a 2 million ton/yr hole in local pulpwood markets. Sen. Stephen Goldfinch said that a deal on the project could be announced in the coming three to six months. He further suggested that the 700 jobs lost at the mill would be replaced.

North American updates

The Canadian federal government provided $250,000 in funding to the **Forth Nelson First Nation** in British Columbia for the construction of a brownfield wood pellet mill being developed in partnership with **Peak Renewables**. Announced in late 2020, the proposed mill would have a production capacity of 600,000 tonnes/yr industrial-grade pellets for export (*WBM*, Dec. 2020, p. 7).

Peak bought an idle manufacturing site in Fort Nelson from Canfor for about C$10 million, plus forest tenures for about C$30 million. Startup was initially set for 2022. About 1.3 million tons/yr would be required for the facility.

European updates

Sugar producer **Hungrana** started its new wood-fired steam plant at its mill in Szabadegyhaza, Hungary. ANDRITZ was the equipment supplier.

Resilient growth seen in US forest carbon markets, claims Fastmarkets economist

In 2021, Weyerhaeuser, the largest timberland manager in the United States, set a goal of achieving US$100 million of EBITDA from its Natural Climate Solutions business by 2025. This trajectory, seen as aggressive at the time, has since proved to be a key growth driver as Weyerhaeuser tracks to achieving this target.

Weyerhaeuser is perhaps the most prominent in a wave of US timberlands managers seeking to optimize financial performance from landholdings by complementing traditional forestry operations with forest carbon projects, conservation, renewable energy development, and subsurface leasing for carbon capture and storage (CCS) initiatives.

Over the last five years the forest carbon market in North America has experienced a period of rapid expansion, with a surge in dealmaking and heightened interest from institutional investors. In recent months, major corporations have signed high-profile offtake agreements for forest carbon credits, with the latest focus being on high quality-sequestration projects. At the same time, the uptake of Improved Forest Management (IFM) projects has grown, with over 1 million acres of IFM projects added in 2023 and 2024, reflecting the growing recognition of sustainable forestry as a viable tool for emissions removal and reduction.

The rise in corporate demand for nature-based solutions, coupled with compliance frameworks including California's cap-and-trade and emerging cap-and-invest systems, are reshaping the market landscape. Investors, timberland managers, and carbon project developers are competing in an increasingly competitive and innovative space.

Understanding historical growth and value drivers

The United States holds the fourth largest area of forest cover globally and is a leading producer of forest products. Over the past two decades, the forest sector has undergone significant structural changes, particularly within the pulp and paper industry. While the US remains the world's top producer of wood pulp, annual output has declined sharply – falling by 38% from a peak of nearly 60 million tonnes in 2000 to 37 million tonnes by 2024. This decline was driven by a combination of factors, including reduced demand from the graphic paper sector, aging and undercapitalized pulp mill infrastructure, and sluggish growth in markets such as containerboard and fluff pulp.

The steep decline in demand for pulpwood has forced timberland managers to look for additional sources of value to fill the gap left as their revenue streams shift, including the monetization of forest carbon. Forest carbon projects began to scale rapidly in the 2010s with increasing interest boosted by the development of the Californian cap-and-trade system, spurring the demand for carbon credits derived from the conservation and re-establishment of forests nationwide. By the end of 2024, cumulative forest carbon projects had grown to cover over 9.3 million acres across timberland areas in the United States.

Core to the growth of US forest carbon markets has been the expansion of Improved Forest Management (IFM) methodologies, which incentivize landowners to enhance carbon sequestration through sustainable forest management practices. By optimizing tree growth cycles, reducing harvest intensity, and extending rotation ages, IFM projects allow forests to store more carbon in comparison to conventional timber operations. This approach has been particularly attractive to managers who seek to diversify their revenue streams while keeping productive forests sourcing the traditional forest products markets. Currently, IFM methodologies account for 86% of all the non-compliance forest-based credits issued in the country and are the primary source of credits tied to compliance systems. The remainder of that amount relates to credits issued under Afforestation, Reforestation and Revegetation (ARR) protocols.

Regional distribution. The regional distribution of forest-based carbon projects across the United States varies widely, with Alaska and the West Coast historically accounting for most of the acreage enrolled in carbon initiatives. In recent years, however, the US South has emerged as a major growth region. Although this area holds the largest share of forest cover in the country, only about 0.7% of its forests are currently enrolled in carbon projects. Despite that small penetration, the South was responsible for 63% of all forest-based carbon credit issuances nationwide in 2024. This shift is particularly significant given that the region has been among the hardest hit by the decline in the pulp and paper industry. As a result, timberland managers in the South are increasingly turning to forest carbon as a value-added opportunity to diversify revenue streams and stabilize long-term returns.

Interacting compliance and voluntary carbon markets

The US forest carbon market consists of both compliance-driven and voluntary segments. Compliance markets impose stringent eligibility criteria, limiting participation to certain projects or project types. Meanwhile, voluntary markets offer a wider set of opportunities, attracting a diverse base of landowners, from private timberland managers to conservation-focused organizations.

Many firms are using carbon credits as part of their strategy to meet net-zero commitments. All carbon credits represent 1 tonne of carbon dioxide reduced or removed from the atmosphere; however, companies are increasingly differentiating between credits based on indicators of quality. This includes differences in environmental performance of credits around additionality (ensuring that carbon sequestration wouldn't have occurred without the carbon market) and permanence (the risk of carbon release due to wildfires or land use changes). As a result, demand is shifting toward credits utilizing methodologies with robust baselines and strict provisions for ensuring long-term carbon impacts.

From a supply perspective, annual issuances of forest-based carbon credits fluctuated between 6 and 46 million credits over the last decade, largely influenced by market trends, shifts in federal regulations, and oscillating demand for traditional wood products. The early growth in issuance was concentrated on the US West Coast reflecting growth in demand for regional cap-and-trade systems. In recent years, growth in the US South has sought to meet growing voluntary demand as forest managers look to generate additional revenues from existing forest assets and mitigate volatility in prices for pulp.

Contrasting business models for forest carbon activities

Two primary business models dominate the forest carbon space: timberland operators and pure-play carbon project developers. These approaches differ significantly in their economics, risk exposure, and long-term sustainability strategies.

Timberland managers, including Real Estate Investment Trusts (REITs) like Weyerhaeuser and Rayonier, and Timber Investment Management Organizations (TIMOs) like Campbell Global (owned by JP Morgan), are increasingly integrating carbon projects into their asset portfolios. For these firms, carbon credit sales serve as a potential source of upside value to their investments, rather than as a primary financial driver. That is, while IFM and ARR projects can improve long-term forest asset values, timber sales remain the dominant source of revenue.

This also affects the approach to managing financial risk of carbon initiatives. As carbon revenues typically account for a small percentage of total earnings, timberland operators are less exposed to fluctuations in carbon credit prices. Most of the traditional timberland investment strategies target long-term returns, allowing them to commit to long project timelines without the same concerns about volatility risks faced by pure-play developers. Further, as such investors are often backed by established institutional investors, they are generally able to raise finance at a lower cost of capital than pure-play developers, that are more intensely affected by the volatility of carbon credit prices.

Pure-play carbon project managers–such as Finite Carbon and Anew–tend to work closely with landowners to develop projects that meet compliance or voluntary market standards. Since their revenue is primarily derived from carbon credit issuance and transactions, these companies

North American wood biomass projects

RECENT ANNOUNCEMENTS 2023-24 Company	Location	Wood use (000 tons)	Reported start date	Annual output	Cost (US$/mm)	Project type
Pathway Energy	Port Arthur, TX	2200	4Q/29	30 mm gal.	$2,000	Liquid biofuel
Simply Blue Group	Goldboro, NS	800	n/a	150k tonnes	n/a	Liquid biofuel
Aymium	Williams, CA	500	4Q/25	n/a	$210	Biocarbon
Castlerock Biofuels	Millinocket, ME	300	4Q/27	20 mm gal.	n/a	Biocrude
DG Fuels	Moorhead, MN	n/a	n/a	193 mm gal.	$5,000	Biofuel
Woodland Biofuels	Reserve, LA	n/a	4Q/28	n/a	$1,350	Biofuel
TOTAL WOOD USE (green tons)		**3,800**				
RECENT STARTS						
Arbios Biotech	Prince George, BC	55	1Q/25	50,000 barrels	n/a	Liquid biofuel
Drax (expansion)	Aliceville, AL	260	2Q/24	130k tons	$50	Pellets
Peak Renewables	Dothan, AL	300	1Q/24	150k tons	$30	Pellets
LanzaJet	Soperton, GA	n/a	1Q/24	10 million gal	$200	Liquid biofuel
TOTAL WOOD USE (000 green tons)		560				
ANNOUNCED AND OPERATIONAL 2018 TO PRESENT, WOOD DEMAND POTENTIAL						
Wood Energy (planned)		3,916				
Wood Energy (operational since 2018)		2,640				
Wood Pellets (planned)		31,394				
Wood Pellets (operational since 2018)		9,728				
Liquid Biofuels (planned)		9,677				
Liquid Biofuels (operational since 2018)		**55**				
TOTAL WOOD USE POTENTIAL (000 green tons/year)		**57,410**				

* Indicates newly added item. Listed projects and volumes include all announced proposals. Some may eventually fail to proceed. Periodically, when projects are deemed unsuccessful, the related volumes are adjusted accordingly. For current and projected build-out data, see RISI's Bioenergy Forecast.

For complete project listings, go to RISI's Mill Asset Database, http://www.risiinfo.com/millassets/millLanding.html.

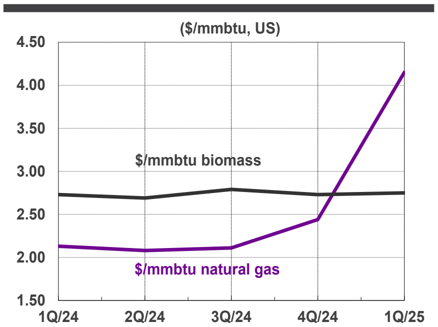
BIOMASS FOCUS, continued

are more sensitive to fluctuations in demand, policy shifts, and evolving corporate sustainability trends. While this model can be highly profitable in strong carbon markets, such managers face substantial downside risks during market downturns.

As firms seek to navigate volatility, they have increasingly relied on long-term offtake agreements to manage price risk. In February, Microsoft agreed a long-term offtake with Chestnut Carbon in which it committed to purchase more than 7 million tons of carbon credits over 25 years. The agreement is estimated to restore roughly 60,000 acres of land by planting over 35 million native, biodiverse hardwood and softwood trees in the Southern United States. These structured agreements provide revenue certainty and reinforce the trend toward high-integrity carbon credits as this niche of the market can capture higher prices and more attractive deal structures.

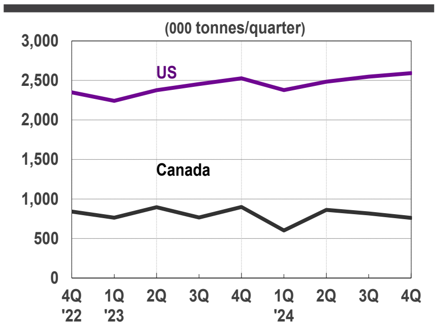
There are some uncommon overlapping examples: Manulife recently announced the successful fundraising of USD 480 million for their Forest Climate Fund, aimed at delivering value through the development of credits from forest-based carbon projects. The fund has already acquired 157,000 acres across 6 different states in the US and will further deploy capital through the acquisition of additional timberlands, to be

Wood biomass v. Natural gas



Note: Biomass price based on *WBMR* national averge. Gas price is Henry Hub.

North American wood pellet exports



Source: Global Trade Atlas.

North American pellet grade wood prices

	1Q 2025	4Q 2024	3Q 2024	2Q 2024	1Q 2024	% chg 2025/24
US Softwood sawmill chips ($/green ton, delivered)						
South Atlantic	$34	33	32	32	33	3%
South Central	$30	30	30	28	30	0%
Northeast	$34	36	32	34	33	3%
Pacific Northwest	$25	28	28	22	22	27%
US Hardwood sawmill chips						
South Atlantic	$35	31	34	33	33	6%
South Central	$35	35	34	34	33	6%
Northeast	$44	45	42	45	41	7%
Lake States	$37	38	37	37	34	9%
Canada Softwod sawmill chips (C$odmt, delivered)						
British Columbia	$76	76	63	63	66	15%

Estimated average open market price over the quarter for clean sawmill residuals (including chips, shavings, and dust) of a grade used in the manufacture of pellets. One odmt (oven dry metric ton) = 2.4 green tons.

North American wood biomass/hog fuel prices

US ($/green ton, delivered)	1Q 2025	4Q 2024	3Q 2024	2Q 2024	1Q 2024	% chg 2025/24
Northeast						
New England	$32	33	31	33	35	-9%
Pennsylvania/New York	$21	18	18	18	18	17%
Lake States	$25	25	26	23	26	-4%
Pacific Northwest						
Oregon	$18	18	18	18	18	0%
Washington	$18	18	21	21	19	-5%
South Central						
In-woods	$21	19	20	18	19	11%
Mill residue	$18	18	18	18	18	0%
South Atlantic						
In-woods	$23	22	26	26	21	10%
Mill residue	$19	20	20	19	21	-10%
Canada (C$/green tonne, delivered)						
Western (British Columbia)	$20	20	24	27	29	-31%

Estimated average open market price over the quarter. Mill residue includes predominantly sawmill bark, with lesser volumes dust and shavings, etc. In-woods includes whole tree chips and grindings from thinnings and land clearing.

managed with carbon assets as the central pillar of its business strategy instead of timber production. At least 60% of that amount under management will be invested in the US. The company, currently the third largest timberland manager in the US, expects to sequester over 6 million tons of CO2 throughout its 12-year investment lifetime.

Ultimately, both models are expected to contribute to the forest carbon market's growth, but their economic dynamics differ markedly. Timberland operators leverage carbon as an asset-enhancing mechanism, whereas project developers operate within a high-risk, high-reward framework dependent on credit price stability.

Forest carbon markets are positioned for growth

The forest carbon market is poised for continued expansion, driven by strong institutional investment and regulatory shifts. Investors recognize the long-term value of forest assets beyond timber, creating a dual-income strategy that combines sustainable harvests with carbon sequestration revenue.

Despite recent movements to cut sustainability and climate-related programs at a federal level, there remains several drivers of increased forest carbon activities in the United States. Some examples include the emergence of new state-based compliance mechanisms that could provide further momentum and increase the domestic demand for forest-based carbon offsets, with states introducing their own carbon markets, such as Washington and Oregon.

Meanwhile, corporate demand for high-integrity forest carbon credits is driving new project standards, with a shift towards high-quality, durable carbon sequestration projects, with technology firms and institutional investors on the forefront for setting stricter standards for credit quality. Forest carbon initiatives will need to emphasize rigorous monitoring, reporting, and verification (MRV) to ensure credibility and adherence to these increasingly stringent market requirements.

The continued restructuring of the US forest product industries may further shift incentives toward carbon markets. With declining demand for pulpwood and regulatory uncertainty surrounding timber harvests on federal lands, many landowners are looking to diversify their revenue streams. This creates a landscape where carbon finance is increasingly seen as a core economic driver rather than a supplementary income source.

As these forces align, forest carbon markets are expected to become more sophisticated, with greater price differentiation between standard and premium credits. Investors and timberland managers who adapt to these market shifts–by prioritizing long-term carbon forestry strategies and aligning their initiatives with high-quality crediting frameworks–will be well-positioned to capitalize on the growing demand for forest-based carbon credits.

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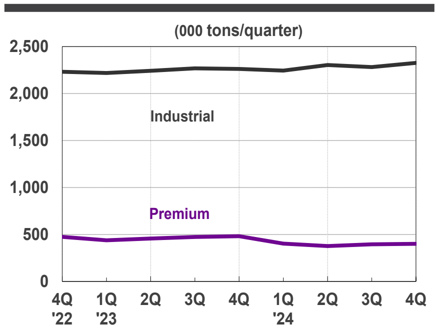
US wood pellet production



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