

United States Forest Products Annual Market Review and Prospects: Country Market Report, 2021-2025

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Abstract

Higher interest rates, resulting from efforts by the Federal Reserve Board of Governors to return inflation to a targeted two percent rate, the Russia-Ukraine war, and international trade disputes are affecting all facets of the United States economy and forest products markets. Presented are data and information on the current state of the United States economy and wood products markets, and near-term prospects. This report is supported by conventional information and statistical data regarding forest product markets in terms of consumption, consumer credit, industrial production, prices, and trade. Information on sawn softwood and hardwood, softwood and hardwood log trade, wood-based panels, paper and paperboard, fuelwood, forest product prices, and new housing sales and starts are presented. Policy initiatives, which may affect domestic markets and international trade in wood products also are discussed. Selected data are provided for the years 2010 through 2026, with estimates for 2023, and forecasts for 2024 and 2025.

Keywords: United States wood product's markets, composite wood products, engineered wood products, fuelwood, furniture, forest product markets, forest products prices, hardwood lumber and log markets, international wood products trade, log and lumber exports and imports, new housing construction, repair and remodeling, roundwood/pulpwood, softwood lumber agreement, softwood lumber and log markets, structural and non-structural panels, woody biomass consumption and production, and biomass and wood energy.

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Executive Summary

This report provides an analysis and evaluation of the status and near-term prospects for the United States economy and forest products markets. Unless otherwise noted, all monetary values are provided in constant 2017 U.S. dollars.

With forecast estimates of gross domestic product (GDP) annual rate of growth of 1.5 percent in 2024 and 1.8 percent in 2025 and 2026, the United States' economic outlook is for slight to moderate growth, compared to the 2023 estimate (2.1 percent GDP growth) (FOMC 2023a). The Federal Reserve Bank of Philadelphia (2023) survey of forecasters provide similar results, with GDP growth estimated at 2.1 percent for 2023, forecasted to decline to 1.3 percent in 2024, rise to 2.1 percent in 2025 and fall to 1.7 percent in 2026.

New housing construction and existing house sales were negatively influenced primarily by increasing interest rates (the 30-year fixed rate average mortgage rose from 2.9 percent in 2021 to 5.3 percent in 2022). Total housing starts and single-family starts were 3.4 and 11.3 percent lower in 2022, respectively, compared to the previous year. Observed values for 2022 were also lower than 2021 levels for new house sales (down 16.9 percent), total residential investment (down 9.0 percent), and investment in non-residential structures (down 2.1 percent). In contrast, manufactured home shipments and residential repair and remodeling investment increased by 6.5 percent and 15.1 percent, respectively between 2021 and 2022.

Housing construction and sales have an explicit effect on many wood products markets, as reflected by overall declines in levels of production and consumption across most wood product categories over the 2021-2022 period. Softwood lumber production had marginal gains (close to one percent) while apparent consumption remained almost unchanged, and both import and exports declined year-over-year. Production of structural panels (oriented strand board and coniferous plywood) was down 1.8 percent and 5.3 percent, respectively. Production of most non-structural panels declined as well, with 2022 volumes down 12.4 percent for hardboard, 29.3 percent for medium density fiberboard (MDF), and 25.0 percent for particleboard.

Conversely, sawn hardwood production and consumption increased between 2021 and 2022 and in the first half of 2023. Wood pellet production continued to grow, increasing 13 percent between 2021 and 2022 and 4.9 percent by the first half of 2023 (weight based). Furniture shipments also increased in 2022, relative to the previous year. Paper and

paperboard production remain in a long decline with 2022 pulpwood production and consumption roughly 2 percent below 2021 levels.

In closing, high interest rates, trade tensions, events in nature, and geopolitical issues are affecting forest products markets, production, and consumption, a pattern that also holds true for world economies.

United States General Economy

Analysis of the United States (U.S.) real GDP indicates signs of slow to moderate economic growth, with the first quarter of 2023 showing a growth rate of 2.0 percent, followed by a 2.1 percent growth rate in the second quarter (BEA 2023). These expansions follow GDP increases in the last two quarters of 2022. The Federal Reserve Board of Governors (FOMC) (2023a) and the Federal Reserve Bank of Philadelphia (FRBP) Third Quarter 2023 Survey of Professional Forecasters (2023) forecast moderate growth in 2023. The forecast for the U.S. real GDP growth was revised upwards for 2023, from 1.2 to 2.1 percent (FOMC 2023a, b) and 1.3 to 2.1 percent (FRBP 2023). Slight to moderate GDP growth is forecasted for the 2024-2026 period, with GDP forecasts at 1.3, 2.1, and 1.7 percent, respectively (FRBP 2023).

Unemployment forecasts for 2023-2026 by FOMC (2023a) and FRBP (2023a) indicate minimal to no increases. The FOMC (2023a) projects the 2023 unemployment rate at 3.8 percent, a marginal increase from the 2022 rate of 3.6 percent (BLS 2023a). FOMC (2023a) forecasts unemployment at 4.1 percent for 2024 and 2025, and 4.0 percent for 2026, while FRBP (2023) projects 4.0 percent for 2024, 4.2 percent in 2025, and 4.1 percent for 2026.

Core inflation, as measured by personal consumption expenditures (PCE), was estimated at 3.7 percent for 2023, decreasing to 2.6 percent in 2024, 2.3 percent in 2025, and 2.0 percent in 2026 (FOMC 2023a). Real PCE increased 9.2 percent between 2021 and 2022 (from \$16.04 to \$17.51 trillion, nominal) and 6.5 percent between first half of 2022 and same period in 2023 (BEA 2023).

The headline Consumer Price Index (CPI) for personal consumption expenditures was estimated at 3.1 percent for the third quarter of 2023, projected to decrease to 2.9 percent in quarter four, and forecast 2.5 percent for 2024 and 2.4 percent for 2025. From 2023 to 2032, headline CPI and PCE inflation are projected at an average annual rate of 2.4 percent and 2.2 percent, respectively (FRBP 2023).

Consumer spending, and associated consumer credit, are often attributed as the primary drivers for the aggregate U.S. economy. Consumer spending accounted for 68.2 percent of GDP in 2022 (Council of Economic Advisers 2023). The Federal Reserve Bank of New York (FRBNY 2023) stated that total household debt (nominal values) was \$17.06 trillion during the second quarter of 2023. Included in this total were house mortgages of \$12.01 trillion and home equity line of credit balances of \$340 billion, student loans of \$1.57 trillion, auto loans at \$1.58 trillion, credit card debt of \$1.03 trillion, and \$527 billion on “other” loans.

Industrial production is an economic indicator measuring real output for all facilities located in the U.S., which includes manufacturing, mining, electric, and gas utility installations. Total industrial production index for August 2023 (103.2) was 0.2 percent less than the same month the previous year (103.5). The preliminary estimate for manufacturing capacity utilization index was 79.7, which was 1.2 percent less than in August 2022 (FOMC 2023e).

As seen in Table 1, total real private residential fixed investment was \$823 billion in 2022, a 9.0 percent decrease from 2021. The first half of 2023 (\$729 billion) was 16.8 percent below the \$877 billion observed the first half of 2022 (note: a 2022 first half higher than the corresponding annual average, points to a decrease in the second half of the year). Total 2022 real nonresidential fixed investment in structures was close to \$553 billion, a 2.1 percent decrease from 2021 (at \$565 billion). For the first half of 2023 (\$608 billion) nonresidential investment was 10.2 percent above the level observed over the first half of the previous year (\$552 billion) (BEA 2023).

Major Market Developments in the United States Affecting Forest Products Consumption

New housing construction and housing sales

New single-family starts and sales are vital for the wood products industry, with new housing units consuming more value-added products than any other wood-utilizing sector. In April 2022, new housing starts began to decline, primarily due to rising interest rates (increasing prices and lowering affordability) and a limited quantity of new houses for sale. The 30-year conventional loan rate, at 5.6 percent over the third quarter of 2022, increased to 7 percent by the third quarter of 2023 (Freddie Mac 2023). In 2022, total housing starts were

1,551,250 units and single-family starts were 1,004,420 units (seasonally adjusted annual rate (SAAR)), reflecting a 3.4 percent and 11.3 percent decrease from 2021, respectively (Table 1). Multi-family starts rose 14.7 percent between 2021 and 2022, from 462 to 531 thousand units (SAAR). In the first half of 2023, total housing starts averaged 1.41 million units and single-family starts were 880 thousand units. Total starts were 15.7 percent less compared to the same period in 2022 (1.68 million units) and single-family starts were 22.3 percent fewer than reported for first half of 2022 (1.13 million units). Multi-family starts, in first half of 2023, averaged 520 thousand units, or 1.0 percent less than reported for the same 2022 period (Census 2023a).

The Mortgage Bankers Association (2023) estimate total housing starts for 2023 at roughly 1.43 million units (SAAR), which is 7.7 percent lower than observed in 2022 (Table 1). The single-family estimate is 936 thousand units (SAAR), a decline of 6.8 percent from 2022. Projections for 2024 include increases of 2.8 percent (to 1.47 million units) and 10.7 percent (to nearly 1.04 million units) from 2023 for total and single-family units, respectively. New house sales (SAAR, Table 1) are estimated at 692 thousand units in 2023 and projected to 755 thousand units in 2024, while the forecast for 2025 stands at 785 thousand units (MBA 2023).

Table 1. Selected U.S. economic indicators, 2021–2025.

Indicator	Actual		Estimate ^b	Forecast ^b	Forecast ^c
	2021	2022	2023	2024	2025
Gross domestic product (billion 2017 dollars)	21,408	21,822	22,280	22,592	23,033
New housing starts (thousand units)	1,606	1,551	1,432	1,472	1,555
New single-family starts (thousand units)	1,132	1,004	936	1,036	1,125
New multi-family starts (thousand units)	462	531	515	435	430
New housing sales (thousand units)	771	641	692	755	785
Manufactured housing shipments (thousand units)	106	113	130	143	153
Total residential fixed investment (billion 2017 dollars)	904	823	903	973	1,028
Total nonresidential fixed investment-structures (billion 2017 dollars)	565	553	636	700	749
Furniture and related products (Index: 2017 = 100)	88.7	90.6	80.6	81.1	84.7
Paper products (Index: 2017 = 100)	95.1	93.5	99.6	111.1	116.7
Wood products (Index: 2017 = 100)	99.0	100.1	95.1	92.2	92.5
Total industrial production (Index: 2017=100)	99.2	102.6	102.69	102.36	103.01

Sources: ^a BEA 2023, c; Census 2023a, b, d; FOMC 2023c, f, g; FRBP 2023; MBA 2023.

^b Congressional Budget Office 2023; FOMC 2023c, f, g; MBA 2023; Urban Institute 2022; USDA FS estimates based on historical and first-half 2023 data.

^c Congressional Budget Office 2023; FOMC 2023c, f; FRBP 2023; MBA 2023; Urban Institute 2022; USDA Forest Service estimates based on historical and first-half 2023 data; Y Charts 2023.

Total housing permits in 2022 were 1,666,167 units and single-family permits were 975,250 units (SAAR), 4.2 percent and 12.8 percent decline from 2021, respectively. Multi-family permits increased 10.9 percent from 2021 to 2022, from 620,750 to 690,917 units. In the first half of 2023, total permits were 1,437,833 units and single-family permits were 842,500 units (SAAR), a decrease of 20.1 percent and 23.9 percent, respectively, from same period in 2022. Multi-family permits averaged 595,333 units (SAAR) in the first half of 2023, a 14.0 percent decrease from the total units reported for the same period in 2022 (Census 2023b).

In 2022, total housing completions were 1.39 million units and single-family housing completions were 1.02 million units (SAAR), resulting in a 3.5 percent and 5.3 percent year-over-year increase, respectively. Multi-family housing completions were close to 357 thousand units in 2022 and approximately 363 thousand units in 2021; a 1.7 percent decrease. In the first-half of 2023, total housing completions were 1.49 million units and single-family completions were 1.01 million units (SAAR). Total completions were 9.1 percent higher and single-family completions were 0.6 percent lower than recorded over the same period in 2022. Multi-family completions averaged 463 thousand units (SAAR) in the first half of 2023, 38.2 percent more than reported for the same period in 2022 (Census 2023a).

New house sales reached 641 thousand units (SAAR) in 2022 (Table 1), a 16.9 percent decrease from 2021. During the first half of 2023, new house sales were 357 thousand units, a 3.8 percent drop from the 371 thousand units sold over the same period in 2022 (Census 2023c). Decreasing new house construction and sales markets have been attributed to increasing mortgage costs, an undersupply inventory of affordable new houses, a lack of construction workers, regulatory burdens, stringent builder financing requirements, student loan debts accrued from higher education, shifting attitudes towards home ownership, under-employment, and stagnant-to-declining median incomes.

Existing housing, and their sales, are important for the residential repair and remodeling (R&R) subsector. In 2022, a total of 5.03 million existing home units (SAAR) were sold, a 17.8 percent decline from 2021 (6.12 million units). The decline continued into 2023 with approximately 3.9 million units sold by September, a 15.4 percent drop from levels observed in September 2022 (FRED 2023, Statista 2023). The median age of a U.S. housing unit is 40 years and increasing – 1978 is the median year in which a residential structure was built

(Census 2022c), which highlights the significance of residential R&R to wood products consumption.

Manufactured housing fabrication and sales has historically played a pivotal role in meeting U.S. housing demand. Manufactured housing (e.g., mobile, modular, etc.) production and shipments, while increasing, remains well under the greatest shipment years of 1973 (580 thousand units) and 1998 (373 thousand units). Shipments in 2022 were 113 thousand units, a 6.5 percent increase from the previous year (Table 1). In the first half of 2023, shipments stood at 85 thousand units, 29.1 percent lower than the first half of 2022 (Census 2023d). Karan and Pang (2022) projected 130 thousand units shipped in 2023, 143 thousand in 2024, and 153 thousand in 2025.

Construction expenditures

U.S. Census (2023e) estimates of residential construction expenditures (SAAR) show 2022 total residential construction at \$908.3 billion, with single-family at \$442.5 billion and multi-family at \$104.9 billion. Repair and remodeling expenditures (nominal dollars) in 2022 are estimated at \$447.8 billion (LIRA 2023a). These expenditures all increased from 2021 to 2022 (increases of 5.3 percent for total residential construction, 8.2 percent for single family, 6.7 percent for multi-family construction, and 15.1 percent for R&R). Between the first half of 2022 and the first half of 2023, total residential construction expenditures fell 10.3 percent, from \$965.4 to \$866.4 billion. Similarly, single-family construction dropped 21.5 percent, from \$481.9 to \$378.5 billion over the same period. Expenditures for multi-family construction rose 21.8 percent over this period (from \$108.1 billion to \$131.7 billion) (Census 2023a), while residential R&R expenditures rose 11.2 percent (to \$476.5 billion, nominal) (LIRA 2023a). In 2023, Harvard University's Leading Indicator of Remodeling Activity estimated first through fourth quarter 2023 expenditures (nominal dollars) for R&R at \$469, \$484, \$489, and \$479 billion, respectively (LIRA 2023a). Annual expenditures in residential R&R are predicted to "... decline at an accelerating rate through the first half of 2024" (LIRA 2023b).

Residential R&R currently utilizes a greater quantity of wood products than new housing construction and extends to a variety of projects, some that require substantial amounts of solid wood products and others that do not. In general, major repair and remodeling activities are classified as maintenance and repairs, additions and alterations, and major replacements.

Maintenance and repair expenditures are for upkeep of a residential property rather than additional investment in the property. Addition and alteration expenditures are for enlargements or improvements to or within the residential structure, or the property. Major replacements are construction improvements to the property and are closely related to maintenance and repair.

Nonresidential expenditures are being affected by work-at-home, lingering COVID-19 effects, electronic commerce, and over saturation of commercial buildings. Nonresidential construction is typically segmented into several categories, including commercial, conservation and development, educational, health care, lodging, manufacturing, office, and religious construction subsectors. Investment in these nonresidential subsectors (Table 1) was estimated at \$552.9 billion (SAAR) in 2022, a 2.1 percent decrease from the \$564.8 billion observed in 2021. In the first half of 2023, total spending for these subsectors increased by 10.2 percent to \$496.1, from \$386.2 billion in the first half of 2022 (BEA 2023).

Overview of United States Forest Products Markets

With ample forest resources and vast production capacity, the U.S. leads global production and is also one of the largest consumers of wood products, playing an essential role in global forest products markets. The U.S. is the world's greatest producer of industrial roundwood (i.e., wood in rough form, whole and/or chipped logs used in industrial manufacturing) (19 percent in 2020), wood pellets (17 percent), and pulp for paper (26 percent). The U.S. is the second leading producer of sawnwood (17 percent), wood-based panels (9 percent), recovered paper (18 percent), and paper and paperboard (17 percent). The U.S. is a leading consumer of industrial roundwood (18 percent), sawnwood (22 percent), wood-based panels (13 percent), recovered paper (12 percent), and paper and paperboard (16 percent) (FAO 2022).

The United States forest products industry, comprised of National Industrial Classification System (NAICS) sectors 321 (wood products), 322 (paper and paperboard products), and 337 (furniture), contributed \$128.31 billion to the U.S. real GDP in 2021 and \$121.1 billion in 2022 (5.7 percent and 5.3 percent of total manufacturing GDP, respectively) (BEA 2023).

Four major production indexes for forest products include furniture and related products, paper products, wood products, and total industrial production (Table 1):

- Furniture and related products are key indicators for higher-grade hardwood lumber. This index increased 2.1 percent from 2021 to 2022 and declined 8 percent to 83.3 by August 2023 (Table 1D, FOMC 2023c).
- Paper products are an important indicator for pulpwood and wood residues, as well as recycled fiber. This index declined 1.7 percent from 2021 to 2022 and declined an additional 8.2 percent to 85.8 by August 2023 (Table 1B, FOMC 2023d).
- Wood products are an important indicator for the overall forest products industry. This index increased 1 percent from 2021 to 2022 and declined 5 percent to 95.1 by August 2023 (Table 1B, FOMC 2023d).
- Industrial production and capacity utilization are principal indicators for pallet lumber, containerboard, and discrete grades of paper. This index increased 6.6 percent from 2021 to 2022 and increased an additional 0.9 percent to 103.5 by August 2023 (FOMC 2023d).

In 2021, the U.S. wood industry manufactured 63.417 million m³ of softwood lumber; 15.930 million m³ of sawn hardwood; 21.22 million m³ of structural panels (softwood plywood and Oriented Strand Board or OSB); and 10.36 million m³ of nonstructural panels (hardboard, MDF, and particleboard) (Table 2). Engineered products manufactured in 2021 include 2.09 million m³ of laminated veneer lumber (LVL); 396 thousand m³ of glued laminated timber (Glulam); and 172.18 million linear meters (LM) of I-Joist (APA 2023).

In 2022, the U.S. produced nearly 183 million m³ of pulpwood used in the production of wood pulp for paper and paperboard products and in particle board, oriented strand board, and fiberboard production. Pulpwood production in 2022 declined 1.6 percent from the approximate 185.7 million m³ produced in 2021 (Table 2). Domestic paper and paperboard production declined 3.3 percent, from 68.2 metric tons (MT) in 2021 to 66 million MT in 2022 (FAO 2022, 2023).

Table 2. Prospects and statistics for forest and wood products, 2021 – 2024^{a,b}

Sawn Softwood (Coniferous)					Sawn Hardwood (Deciduous)				
	2021	2022	2023 ^b	2024 ^b		2021	2022	2023 ^b	2024 ^b
Production	63,417	64,039	64,178	64,820	Production	15,930	17,643	23,629	19,780
Imports	37,404	36,350	36,486	36,851	Imports	593	792	500	525
Exports	2,896	2,540	2,727	2,890	Exports	3,317	3,334	2,500	2,650
Consumption	97,925	97,849	97,937	98,781	Consumption	13,206	15,101	21,629	17,655
Oriented Strand Board (OSB)					Coniferous Plywood (Softwood)				
	2021	2022	2023 ^b	2024 ^b		2021	2022	2023 ^b	2024 ^b
Production	13,839	13,592	14,040	14,243	Production	7,378	6,990	7,489	7,601
Imports	6,147	6,198	6,236	6,326	Imports	2,137	2,032	2,169	2,202
Exports	182	154	185	188	Exports	466	416	473	480
Consumption	19,804	19,637	20,091	20,381	Consumption	9,049	8,606	9,185	9,323
Hardboard					Medium Density Fiberboard (MDF)				
	2021	2022	2023 ^b	2024 ^b		2021	2022	2023 ^b	2024 ^b
Production	499	437	504	509	Production	3,882	2,746	3,901	3,921
Imports	252	259	255	258	Imports	2,552	2,939	2,565	2,578
Exports	248	215	250	253	Exports	422	529	424	426
Consumption	503	481	509	514	Consumption	6,012	5,156	6,042	6,073
Particleboard					Roundwood Pulpwood				
	2021	2022	2023 ^b	2024 ^b		2021	2022	2023 ^b	2024 ^b
Production	5,983	4,489	6,073	6,164	Production	185,734	182,650	187,318	186,526
Imports	1,443	1,168	1,465	1,487	Imports	12	72	77	44
Exports	445	437	452	459	Exports	110	75	87	113
Consumption	6,981	5,220	7,085	7,191	Consumption	185,636	182,646	187,308	186,457

^a All volumes are reported in thousand m³.

^b USDA FS estimates.

Sources: AF&PA 2023; APA 2023; CPA 2023; HMR 2023; U.S. Department of Agriculture (USDA), Foreign Agricultural Service (USDA FAS) 2023, WHPA 2023.

Timber Products Production, Trade, and Consumption

Statistics and Projections

Statistics for U.S. solid wood and biomass products consumption, production, and trade are collected periodically by U.S. governmental agencies and by industry associations. These

statistics provide an overview of wood consumption and of production sectors of the U.S. economy, indicating change over time. The information does not provide the detail required to assess in-depth changes of consumption and production for discrete end-use markets. In this report, markets of interest include new housing construction (single-family, multi-family, and manufactured/modular); repair and remodeling of existing residential structures; low-rise nonresidential buildings and ‘other’ nonresidential construction types; furniture and other manufactured wood products; and packaging and shipping. These end-use markets typically account for 80- to 90 percent of all solid wood products consumption (McKeever and Howard 2011).

The following section provides data, estimates, and forecasts along with narratives from industry professionals for leading sectors and sub-sectors of the U.S. wood product’s markets. Estimates and forecasts for wood products are presented in Table 2, with values reported in 1,000 m³. Data for 2023 are estimates while years 2024 and 2025 provide USDA FS forecasts.

United States Wood Product’s Markets

With plentiful forest resources and exceptional production capacity, the U.S. is the world’s leading producer and largest consumer of wood products. As such, the U.S. continues to play a significant role in global forest products markets. The U.S. is the world’s leading consumer of industrial roundwood and pulp for paper; the second largest consumer of sawnwood, recovered paper, and paper and paperboard; the largest producer of industrial roundwood, wood pellets, and pulp for paper; and the second leading producer of sawnwood, wood-based panels, recovered paper, and paper and paperboard (FAO 2021).

Sawn Softwood

The largest value-added market for sawn wood products is the housing construction sector. Since 2010, consumption of sawn softwood by the housing sector (new construction plus R&R) has increased in market share (Fig. 1), from 52.4 percent in 2010 to 75.8 percent in 2021 (32.7 million m³) (WWPA 2022). U.S. housing construction declined during the first half of 2023, as single-family starts were 22.3 percent lower than reported for the first half of 2022 (Census 2023a). The R&R sector has been a substantial consumption sector of sawn softwood, with apparent consumption at roughly 34.41 million m³ in 2021 (WWPA 2022). Construction of new

housing units has not kept pace with population growth, supporting the potential for future sawn wood markets.

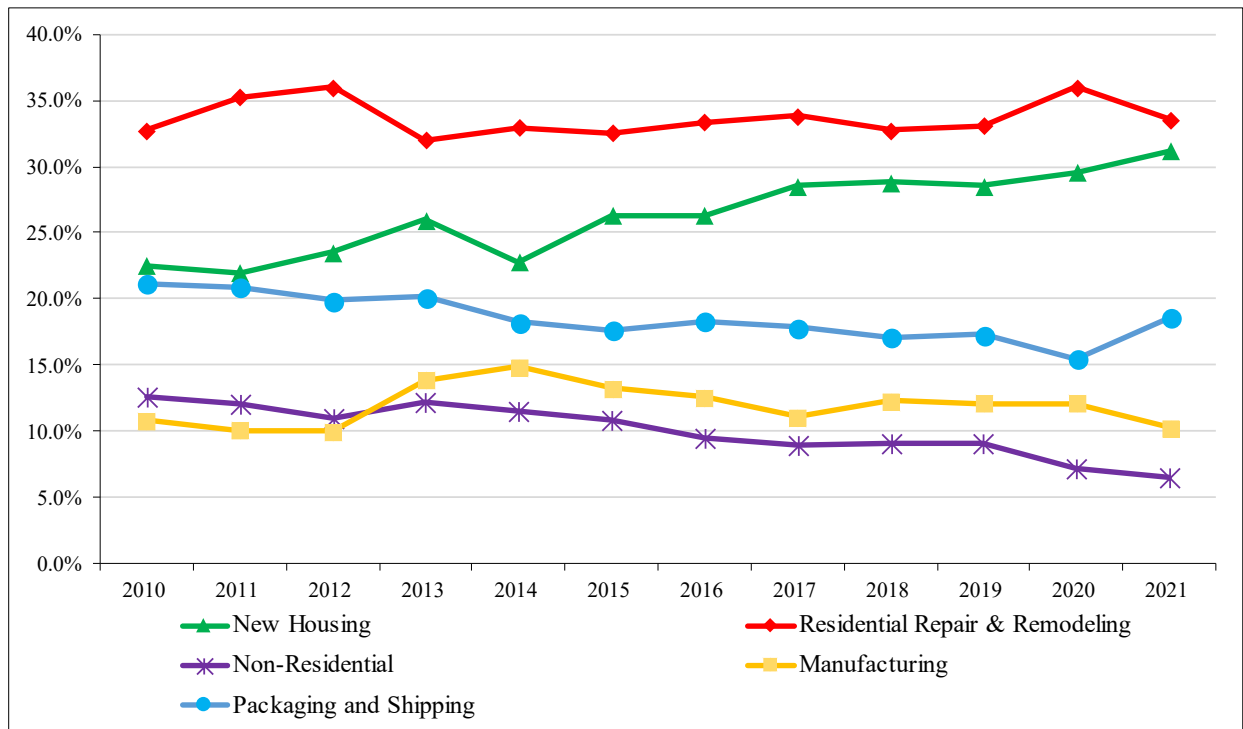


Figure 1. Solidwood timber products consumption market shares, 2010-2022.

Sources: AF&PA 2023, APA 2023, CPA 2023, HMR 2023, WWPA 2022, 2023.

The Western Wood Products Association (2023) reported U.S. nominal sawn softwood lumber production of nearly 64.04 million m³ in 2022, close to one percent increase from the 63.42 million m³ produced in 2021 (Table 2). Higher production in the U.S. South (37.67 million m³ in 2022, a 5.9 percent increase from 2021 levels) was offset by lower production in the U.S. West (down 6 percent, from 24.49 million m³ to 23.49 million m³). During the first quarter of 2023, U.S. softwood lumber production was down 2.1 percent (15.17 million m³) compared to the same period in 2022 (16.09 million m³).

Sawn softwood imports decreased 2.8 percent in 2022 to 36,350 thousand m³, with 82.7 percent (30,067 thousand m³) of all sawn softwood imports coming from Canada. In the first half of 2023, U.S. softwood lumber imports decreased 6.4 percent (to 17.21 million m³) from the 18.39 million m³ of lumber imports observed over the same period in 2022 (USDA FAS 2023).

In 2022, sawn softwood exports were 2.54 million m³, or 12.3 percent lower than 2021 (2.9 million m³). Sawn softwood exports remained almost flat over the first half of 2023 when compared to the same period in 2022 (at 1.29 million m³) (USDA FAS 2023). Apparent consumption in 2022 was 97.85 million m³, an increase of 13.6 percent over the 2021 estimate (USDA FAS 2023; WWPA 2023).

Sawn Hardwood

The hardwood resource comprises 57.8 percent of the United States timberland acreage and nearly 72 percent of the eastern deciduous forest is owned by private landowners (Alig and Butler 2004). From 1990 to 2000, Canada was the largest export market for U.S. sawn hardwood on a volume basis. By 2009, China imported the largest share of U.S. hardwood lumber at 45 percent. Similarly, on a value-basis, Canada was the most important export market from 1990 to 2000, while China became the most important by 2013 (Luppold and Bumgardner 2020). In 2022, top export markets included China (with 33 percent of all hardwood lumber exports), Canada (19 percent), and Vietnam (11 percent). Top import markets included Canada (with 38 percent of all imports), Brazil (16 percent), and Germany (8 percent) (USDA FAS 2023).

Sawn hardwood production (Table 2) was 17.64 million m³ (nominal) in 2022, an increase of 11 percent from the estimated 15.93 million m³ produced in 2021 (HMR 2023). Apparent consumption was 15.10 million m³, an increase of 14.3 percent from 2021.

Sawn hardwood imports increased 33 percent from 2021 to 2022 (to 792 thousand m³), while exports remained almost flat at approximately 3.33 million m³. In the first half of 2023, sawn hardwood lumber imports decreased 25.7 percent (to 308.87 thousand m³) from the first half of 2022, and exports decreased 22.3 percent (to 1.46 million m³) (USDA FAS 2023).

Softwood Log Trade

U.S. softwood log exports were 7.58 million m³ in 2022, a decrease of 29.6 percent from the 5.34 million m³ exported in 2021. The downward trend persisted through the first half of 2023, with exports at 2.47 million m³, down 8.2 percent compared to the 3.02 million m³ exported over the first half of 2022. The continued decline in exports to China is a principal factor in the overall decrease.

U.S. softwood log imports have been a minor constituent of U.S. softwood consumption, with imports ranging from 0.04 percent to 0.96 percent of total U.S. softwood utilization (1965 to 2020). Softwood log imports increased 23.5 percent between 2021 and 2022, from 474 thousand m³ to 586 thousand m³ (USDA FAS 2023).

Hardwood Log Trade

U.S. hardwood logs are a valuable U.S. export product while imports are minor in comparison. From 1990 to 2013, Canada imported the most U.S. hardwood logs on a volume basis. On a value basis, Japan imported the most logs in 1990, while Canada was the leader from 2000 to 2013 (Luppold and Bumgardner 2020).

Hardwood log exports experienced marginal growth in 2022 (a 0.2 percent increase from 2021 levels). U.S. hardwood log exports reached 976 thousand m³ by the first half of 2023, an 11.9 percent decrease from the 1.11 million m³ reported over the same period in 2022 (USDA FAS 2023).

Historically, Canada has provided nearly 95 percent of total hardwood logs imported to the United States. While imports rose by 11.6 percent between 2021 and 2022 (from 221 thousand m³ to 198 thousand m³), import volumes had decreased 34.9 percent by first half of 2023 relative to the same period in 2022 (from 127 thousand m³ to 83 thousand m³) (USDA FAS 2023).

Pulpwood

Roundwood pulpwood production declined by 1.6 percent from 2021 to 2022 (from 185.6 million m³ to 182.6 million m³), in response to declining demand from pulp, paper, and paperboard industries, the primary drivers for U.S. pulpwood demand (Table 2). For the past few decades, demand for several categories of papers have declined progressively. Since the advent of electronic media, demand for newsprint, printing (including glossy paper for magazines), and writing paper demand has notably declined. Conversely, the upsurge of on-line shopping (i.e., e-commerce) has increased the demand for containerboard products.

U.S. paper and paperboard production decreased 3.3 percent from 2021 to 2022 (to 65.3 million MT). Production levels decreased from 2021 to 2022 for both paper (1.5 percent

decrease) and paperboard production (4 percent decrease). Roundwood pulpwood consumption for wood pulp production was down 5.3 percent from 2021 to 2022, with most feedstock coming from softwood roundwood (AF&PA 2023).

Furniture

Historically, U.S. furniture manufacturing was one of the larger consumers of grade hardwood lumber. The golden age of furniture making in the U.S. ran from the early 1970's through the mid-1990's. Furniture manufacturing offshoring, then and now, has multiple negative effects on the U.S. wood products sector, including decreases in sawn hardwood lumber production and consumption. In 1999, 6.14 million m³ of sawn hardwood lumber was utilized by U.S. furniture industries; 1.00 million m³ in 2013; and 1.08 million m³ in 2020 – a 468.9 percent decline from 1999 (HMR 2023).

Smith Leonard (2023) reported that new furniture orders increased 22.9 percent (to 2.54 billion) from June 2022 to June 2023 (2.07 billion), while furniture shipments decreased 28.5 percent (to 2.48 billion), and order backlogs decreased 55.7 percent (to 2.92 billion).

Structural Panels

Structural panels, which include softwood plywood and OSB, are value-added products commonly used in residential construction. Total structural panel production in 2022 was estimated at 20.58 million m³, a 3 percent decrease from the 21.22 million m³ reported for 2021. In the first half of 2023, structural panel production was 10.2 million m³, or 2.9 percent below production reported for the first half of 2022 (10.5 million m³). Imports of structural panels decreased slightly (0.6 percent) between 2021 and 2022, from 8.28 to 8.23 million m³, respectively. Export volumes decreased 12.1 percent from 2021 to 2022 (from 648 thousand m³ to 570 thousand m³). Lower trade volumes were also observed when comparing activity over the first half of the year, with 2023 import and export volumes down 19.9 percent and 16.9 percent, respectively, compared to 2022 (USDA FAS 2023).

U.S. production of OSB declined 1.8 percent from 2021 to 2022 (to 13.59 million m³) (Table 2). Apparent OSB consumption decreased marginally (0.8 percent) between 2021 and 2022, from 19.8 to 19.64 million m³. In the first half of 2023, OSB production was 7.47 million m³, a decrease of 3.7 percent from the first half of 2022 (APA 2023). Imports in 2022 reflect a

minimal increase (0.8 percent) from 2021 levels, while exports decreased by 15.6 percent (from 182 to 154 thousand m³). In the first half of 2023, OSB imports dropped by 15.2 percent (from 3.39 million m³ to 2.87 million m³) compared with the first half of 2022, while exports rose marginally (0.5 percent) to 79 thousand m³ (USDA FAS 2023).

The U.S. produced 6.99 million m³ of softwood plywood in 2022, a 5.3 percent decrease from 2021. Apparent softwood plywood consumption was 4.9 percent below the 2021 total, at 8.61 million m³ (Table 2). In the first half of 2023, softwood plywood production at 3.59 million m³ was down by 1.6 percent compared to first half of 2022 (APA 2023). Both imports and exports of softwood plywood had lower volumes traded in 2022, with imports 4.9 percent lower and exports 10.7 percent lower than in 2021 (Table 2). The trend is similar when comparing the first half of 2023 to the same period in 2022, although with higher magnitudes: imports were 34.6 percent lower (down from 1.1 million m³ to 718 thousand m³) and exports were 22.7 percent lower (down from 218 thousand m³ to 169 thousand m³) (USDA FAS 2023).

Engineered Wood Products

As reported by APA-The Engineered Wood Association (2023), U.S. production of Glulam reached 386 thousand m³ in 2022, down 2.5 percent from the 396 thousand m³ produced in 2021. Glulam production in the first half of 2023 was 15.4 percent lower than the same period in 2022 (down from 202 thousand m³ to 171 thousand m³).

I-joist production was 143.59 million LM in 2022, a 16.6 percent decrease from 2021 (172.18 million LM). I-joist production in the first half of 2023 was 35.1 percent lower than the same period in 2022 (down from 82.48 million LM to 53.52 million LM) (APA 2023).

LVL production was 2.03 million m³ in 2022, 3.0 percent below 2021 production levels (2.09 million m³). U.S. production of LVL in the first half of 2023 was 20.8 percent below production reported for the same period in 2022 (APA 2023).

Hardwood Plywood

U.S. hardwood plywood demand is primarily dependent on U.S. production of downstream products that include kitchen cabinets, recreational vehicles, manufactured housing, fixtures, underlayment, and furniture. Cabinets are an especially important end-use, with

large quantities of domestically produced and imported hardwood plywood consumed in cabinet manufacture (U.S. International Trade Commission 2017).

Hardwood plywood imports were 51.5 percent lower in the first half of 2023 relative to the same period in 2022 (down from 2.18 million m³ to 1.06 million m³). U.S. hardwood plywood exports were 19.3 percent lower over the same period (down from 57 thousand m³ to 46 thousand m³) (USDA FAS 2023).

Particleboard and Medium Density Fiberboard

Particleboard (a composite wood product) and MDF account for well over one half of all nonstructural panels consumed in the U.S. According to Composite Panel Association data (2023), particleboard production decreased 25.0 percent between 2021 and 2022, from 5.98 million m³ to 4.49 million m³ (Table 2). Particleboard imports decreased 18.5 percent to 1.17 million m³, while exports dropped 1.7 percent, to 437 thousand m³.

Production of MDF was 2.75 million m³ in 2022, a 29.3 percent decrease from the 3.88 million m³ produced in 2021 (Table 2) (CPA 2023). Both imports and exports grew between 2021 and 2022 (16.5 and 25.3 percent, respectively).

Hardboard

Hardboard is used primarily in furniture manufacture and in the construction industry. U.S. hardboard production was 437 thousand m³ in 2022, a 12.4 percent decrease from the 499 thousand m³ reported for 2021 (Table 2) (CPA 2023). Imports were 2.9 percent higher in 2022 relative to 2021 (up from 252 thousand m³ to 259 thousand m³), while exports were 13.2 percent lower (down from 248 thousand m³ to 215 thousand m³). Hardboard imports were 31.6 percent lower in the first half of 2023 relative to the same period in 2022 (down from 126 thousand m³ to 86 thousand m³). U.S. hardboard exports, in the first half of 2023, decreased 58.7 percent (51 thousand m³) as compared to the first half of 2022 (125 thousand m³) (USDA FAS 2023).

Fuelwood

Fuelwood is a type of wood fuel where the original composition of the wood is preserved or unaltered from original form and includes firewood (split wood), hog-fuel (shredded wood), and wood chips (both as by-product of wood processing and from in-forest wood chipped material) (United Nations 2018). Fuelwood in the U.S. is used mainly as main or auxiliary heat source, for

cooking, and/or for aesthetic enjoyment by the residential and commercial sectors and for power generation by the electric power and wood products sectors. In 2022, industrial fuelwood production was estimated at 18 million MT, a 7.4 percent increase from 2021 levels (USFS FS estimate).

Numerous forest products manufacturing facilities use fuelwood and mill residues for heat and power generation, while a small amount of roundwood fuelwood is used for electric power production. Fuelwood consumption for industrial heat and/or electricity production by non-wood industries is limited by the low-cost of natural gas and coal (although coal is a declining source of energy).

Forest Products Prices

Forest products wholesale prices vary across all wood producing sectors, including all commodities and lumber and wood products (e.g., lumber and wood-based panels). Lumber and wood products (LWP) substantially outpaced the producer price index (PPI) for all commodities in 2021, 2022, and first half of 2023 (Fig. 2).

The PPI for LWP decreased from 2000 to 2007 by 36.1 percent. The Great Recession's effect on new building construction, furniture manufacture, and remodeling contributed to the decline. The LWP index has fluctuated since 2012, rising from 172.5 in 2012 to a record 347.0 reading in 2021. The LWP PPI reading in 2021 was due to COVID-19 after-effects, as many mills closed due to the pandemic and other mills did not anticipate future demand. The extended time needed to ramp up operations, coupled with transportation issues (lack of rail cars and trucking) and the unexpected demand, resulted in soaring lumber and forest product prices.

In contrast, the unadjusted pulp, paper, and allied products (PPA) PPI has exhibited considerably less overall change. The PPA index increased from 183.7 in 2000 to 236.9 in 2022 (BLS 2023b). Many paper and paper products are essential for daily living and therefore production prices remained relatively steady. Conversely, electronic media and e-commerce have negatively affected paper and paper products production, and subsequently prices have declined due to less demand.

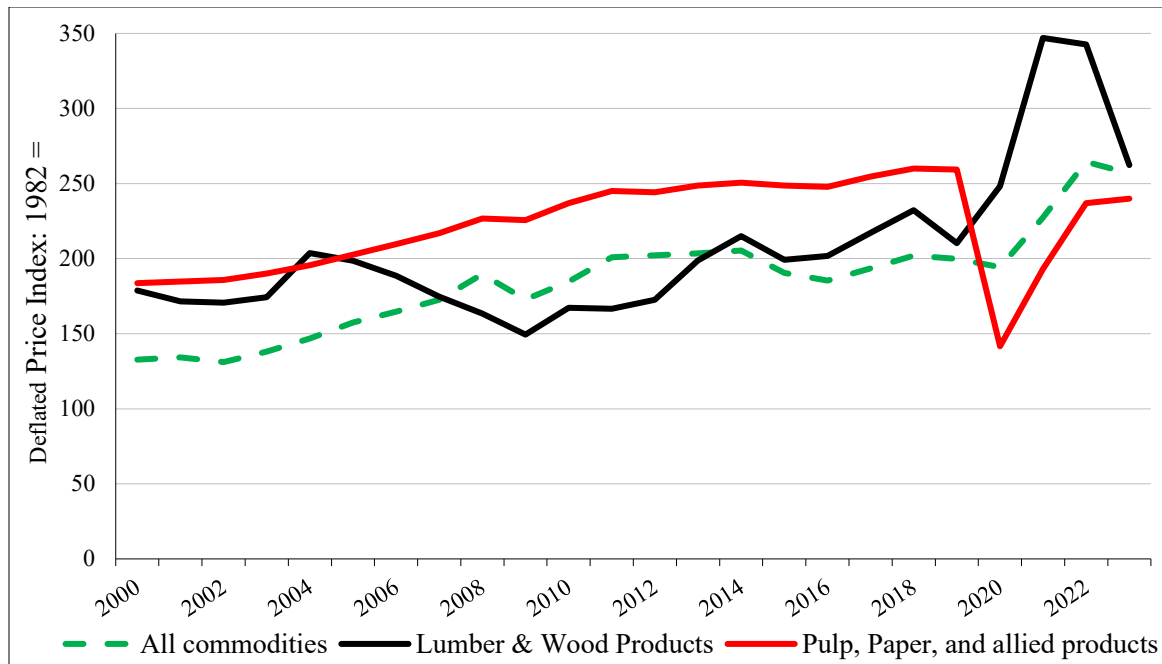


Figure 2. Producer Price Index: All commodities, lumber and wood products, and pulp, paper, and allied products, 2000 – first half 2023.

Source: BLS 2023b.

Energy Policy Initiatives

Wood Energy

Until the 1870's, woody materials were the source of nearly all the U.S.'s energy needs, and wood products were utilized for cooking, lighting, and home and industrial heating needs. By 2022, U.S. energy from wood and wood waste represented close to 2.1 percent of total energy consumption. Wood and wood waste generated close to 2.5 quadrillion (quads) British thermal units (Btu) of energy in 2022, almost unchanged from 2021 levels (EIA 2023).

The U.S. wood energy market includes four major sectors (Fig. 3): industrial (64.4 percent in 2022), residential (21.3 percent), electric power (10.1 percent), and commercial (4.2 percent) (EIA 2023). The industrial sector represents the forest products industry (wood products and pulp and paper), and the quantity of wood energy consumed by the sector has been more closely linked to wood products output than to public policies. The other three-sectors are where public policy is focused, at the state and federal level.

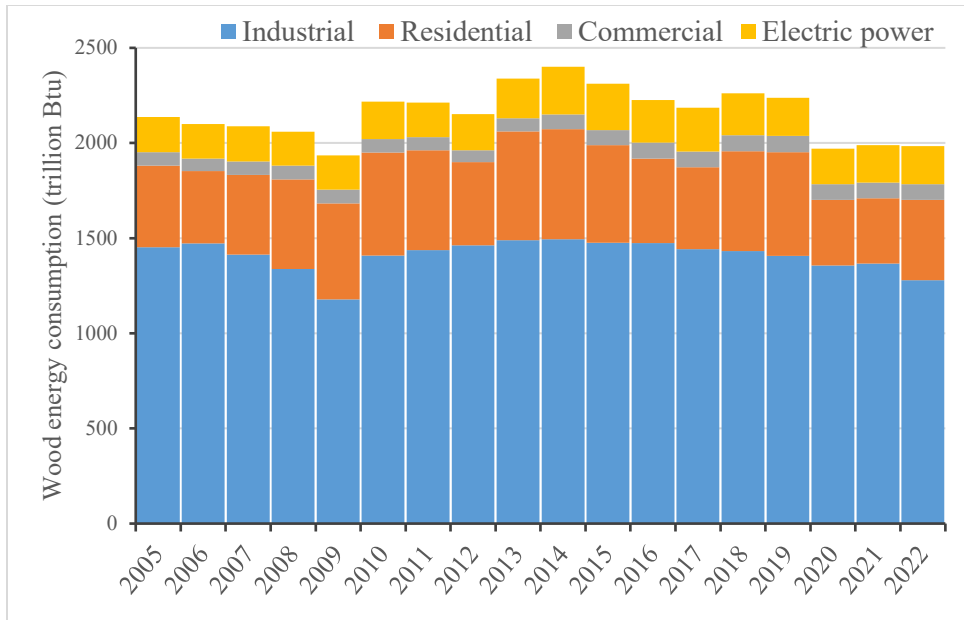


Figure 3. Wood energy consumption by primary sector, 2005 to 2022.

Source: EIA 2023a

Beginning with the Public Utility Regulatory Policies Act (PURPA) of 1978, wood-based materials for energy production received renewed interest. Since then, public policy has focused on promoting biomass for electricity production; in recent years there has been a shift to greater support to produce liquid fuels for transport (i.e., biodiesel and jet fuel). Federal incentives introduced since 2004 include: a) the Renewable Energy Production Tax Credits, b) Clean Renewable Energy Bonds, c) Qualified Energy Conservation Bonds, and d) Investment Tax Credits (Aguilar *et al.* 2011). These incentives are tailored to the electricity generation sector. The Biomass Crop Assistance Program (BCAP) policy was established to aid in meeting U.S. Federal Renewable Fuel Standards. BCAP mandates increased national blended biofuel production (excluding ethanol from corn starch) at 36 billion gallons by 2022, with 21 billion gallons in the form of advanced biofuels (Spaeth 2008).

Bioenergy supply and demand are influenced by policies that seek a reduction of greenhouse gas emissions (GHG) and do not threaten existing bioenergy feedstock production. Wood pellets are recognized as a renewable biomass product, contributing to their increasing demand. The U.S. wood pellet manufacturing sector's expansion originates from steady domestic and increasing foreign demand. During 2022, the U.S. industrial pellet

production capacity for exports (utility grade pellets) continued to increase, although at a slower rate.

The United States International Trade Commission (USITC 2023) reports 9.02 million MT of wood pellet exports in 2022, a 21.0 percent increase from the 7.42 million MT exported the previous year. Major export markets are the United Kingdom and Netherlands with 59 and 20 percent of 2022 total exports by volume, respectively.

Biomass Energy

Biomass energy includes wood and wood processing residues (e.g., fuelwood, wood pellets, lumber and furniture mill sawdust and coarse residue, and black liquor from pulp and paper mills); agricultural crops and residue materials (e.g., corn, soybeans, sugar cane, switchgrass, woody plants, algae, and crop and food processing residues); biogenic materials in municipal solid waste (e.g., paper, cardboard, plant or animal based textiles, food waste, yard trimmings, and wood waste); animal manure; and human sewage. In 2022, biomass provided over 5.04 quad Btu of energy (a 2.6 percent increase from 2021) and 5.1 percent of the U.S. total primary energy production (EIA 2023a).

The utilization of biomass for energy and the simultaneous reduction of GHG's benefit the forest products industry. Biomass is viewed favorably due to potentially reducing GHG's and contributions to other environmental and sustainable energy goals. Thus, biomass complements U.S. environmental and sustainable energy interests. The electric power sector is a major beneficiary of federal public policy support and is undergoing analysis due to GHG emissions.

In 2018, the U.S. Environmental Protection Agency (EPA 2020a) issued a policy statement stating, "EPA's policy in forthcoming regulatory actions will be to treat biogenic CO₂ emissions resulting from the combustion of biomass from managed forests at stationary sources for energy production as carbon neutral." This carbon neutral designation is viewed as a positive development by much of the forest products industry. And while carbon neutrality is still debated, the Biomass Power Association (2020) stated that 30 million tons of carbon dioxide are removed annually by using biomass energy.

The EPA (2020b) "finalized volume requirements under the Renewable Fuel Standard (RFS) program for 2020 for cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuel, and biomass-based diesel for 2021." Cellulosic biofuel targets require 0.59

billion gallons of production (BGD) in 2020, increasing from 0.42 billion gallons in 2019. Biomass-based diesel was 2.43 BGDs in 2020 and 2021; advanced biofuel was 5.09 BGDs in 2020; and renewable fuel was 20.09 BGDs in 2020.

The U.S. EIA (2023) estimates indicate total biomass for energy production at 5.04 quad Btu in 2022, a 2.7 percent increase from 2021. The increase comes primarily from biofuels production with wood energy production increasing marginally (0.6 percent) over the same period. In total, wood energy represented 25.6 percent of all renewable energy production in 2022, a slightly lower share of total renewables compared to 27.0 percent in 2021 (EIA 2023c).

Softwood Lumber Agreement

The Canada–U.S. softwood lumber disagreement had its beginnings in 1982. U.S. softwood lumber producers claim/claimed that the Canadian softwood lumber industry’s access to Crown timber is subsidized (i.e., through reduced stumpage fees) by their respective federal and provincial governments. Between 1982 and 1996, U.S. producers sought relief through the U.S. Department of Commerce (DOC), U.S. International Trade Commission, and the World Trade Organization (WTO). Canadian producers have appealed to NAFTA’s Chapter 19 dispute-settlement mechanism and the WTO. In 1986, a Memorandum of Understanding (MOU) between Canada and the U.S. created phased in tariffs. Canada withdrew from the MOU in 1991; however, the U.S. applied countervailing duties from 1992 to 1996. The Softwood Lumber Agreement (SLA) was enacted in 1996 and there were several iterations of the initial SLA before 2015.

The most recent SLA was in effect from 2006-2015 and was terminated in October 2015, resulting in Canadian producers having access to U.S. markets without the imposition of tariffs. In this SLA, taxes and/or quotas were implemented on a sliding scale (Random Lengths 2021). On April 4th, 2023, the DOC announced the results of the first sunset review for sawn softwood products imported from Canada. The countervailing duty was increased to 7.28 percent (Federal Register 2023a). In July, the DOC and International Trade Administration initiated a review of “Certain softwood lumber products from Canada” and a preliminary weighted-average dumping margin of 7.9 percent was suggested (Federal Register 2023b). On August 22, 2023, Canada

noted that it would challenge the results of the DOC lumber tariffs set in July (Reuters, 2023). The U.S. International Trade Administration recommended a 7.06 percent weighted-average dumping margin for West Fraser Mills, LTD and 6.26 percent for companies not selected for individual review on September 7 (Federal Register 2023c).

Summary

The U.S. began 2023 on a tenuous economic foundation due to increasing interest rates (the FOMC's initiative is to curb inflation, and this is influencing overall markets), inflation, the Russia-Ukraine war, and international tensions. Both FOMC and FRBP revised their 2023 GDP growth projections upwards, to 2.1 percent from a previous 1.2 and 1.3 percent by each entity, respectively. The U.S. economy is uncertain at present, with signs of slowing in 2024, and the United States housing market is showing fluctuation.

U.S housing markets stalled in 2022 and into the first half of 2023. Economic policy and global tensions have constrained new housing construction and sales, and existing sales. In 2022, new construction and R&R continued to be influenced by forest products prices, labor shortages in several industries, and the unavailability of products necessary to complete houses (e.g., appliances, heating and plumbing products, and windows and doors). For 2022, total starts were 3.4 percent and single-family starts were 11.3 percent lower than reported in 2021. New house sales were 16.9 percent lower than reported for 2021, while total residential construction spending decreased 10.3 percent. Single family expenditures dropped 21.5 percent from 2021 to 2022, while multi-family spending increased 21.8 percent and residential R&R's activity increased 15.1 percent.

The lower values on housing construction and sales observed for 2022 affected many wood products markets. Several wood product categories production and consumption volumes trended downwards in 2022, with only sawn products reporting some gains. Softwood lumber production increased close to one percent from 2021 to 2022, and consumption was relatively flat (down by 0.1 percent). Hardwood lumber production and consumption were significantly higher in 2022 compared to 2021 (10.8 and 14.3 percent, respectively). Structural and non-structural panel products and hardwood plywood consumption all declined in 2022.

Wood pellet production and sales continue to increase. Paper and paperboard production remain in a long decline; pulpwood consumption decreased slightly (1.7 percent) in 2022; and furniture production, proxied by value of shipments, increased 8.4 percent.

In summary, factors affecting U.S. economic and wood products activity in 2022 and 2023 include the Federal Reserve Board of Governors decision to control inflation, the Russia-Ukraine war, and international trade tensions. These same factors are also affecting world economies. Thus, global forest products demand is in flux due to increasing interest rates, the Russia-Ukraine war, pandemic aftereffects, trade tensions, events in nature, and geo-political issues.

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Figure Captions

Figure 1. Solid wood timber products consumption market shares, 2000 – 2022.

Figure 2. Wholesale prices of forest products, 1999 – 2022.

Figure 3. Wood energy consumption by primary sector, 2005 to 2022.

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