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U.S. Forest Products Annual Market Review and Prospects, 2013–2017

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Abstract

This report describes the current state and near-term prospective of the U.S. economy supported by general and statistical information on forest products markets in terms of production, trade, consumption, and prices. Market developments are described for sawn softwood, sawn hardwood, softwood log trade, wood-based panels, paper and paperboard, fuelwood, forest product prices, and housing starts. Policy initiatives that can affect domestic markets and international trade in wood products are also discussed in some detail. Data are provided through the end of the year 2015 with estimates for 2016 and forecasts for 2017.

Keywords: production, trade, prices, forest products

Contents

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Executive Summary

Economic activity in the United States exhibited resiliency during the first three quarters of 2016 although economic growth slowed, and the outlook for growth into 2017 is weaker than previously forecast. This outlook is confirmed by the decrease in the estimated annual rate of real gross domestic product (GDP) to 2.6% in 2016, down from the previously expected 2.8%. Economic activity during 2017 is projected to decrease to an annual rate of 2.5%. The growth rate in the U.S. economy will probably remain flat in the first half of 2017 then decrease slightly in the second half of 2017 as predicted by 40 forecasters surveyed by the Federal Reserve Bank of Philadelphia (FRB 2016). The flat growth rate in the U.S. economy predicted for 2017 is inconsistent with the growth in the forest sector because exports from the U.S. economy to China and Europe have increased. Indications are that global trade is increasing, which increases prospects that exports will buoy the U.S. economy in the coming months as exports to China improve. Growth in U.S. real output looks weaker and inflation looks constant for the near term compared with previous estimates. Forecasters expect the labor market to remain nearly unchanged to slightly lower in 2017, measured on an annual-average basis. Unemployment is expected to fall from 4.7% in the 4th quarter of 2016, remain flat the 1st quarter of 2017, then decline to 4.6% in the 2nd quarter of 2017. The unemployment rate was 8.1% at the beginning of 2012 because many unemployed had stopped looking for work. The unemployment rate has declined on average a full percentage point each year since. The forecasters predicted unchanged prices in the 1st quarter of 2017, which is a slightly lower rate than previously expected, and then flat prices in the 2nd and 3rd quarter of 2017. New and existing home sales surged by more than 12% in July 2016 to the highest level since October 2007. The housing recovery, after losing momentum during the second half of 2015, has remained strong during the first two quarters of 2016 and into the first month of the 3rd quarter. New home sales in July 2016 averaged an annualized rate of 654,000, up 12.4% from June 2015 and up 31.3% from July 2015. Sales of existing single-family homes, condominiums, and townhouses fell 3.2% in July 2016 to an annual rate of 5.39 million units (NAHB 2016). Sales were down in all regions except the West. The industry found this decrease discouraging and anticipated a rebound in sales in August 2016.

Growth in the housing sector continued to have a positive effect on softwood lumber consumption in 2016. According to the Western Wood Products Association (WWPA 2016), during the first 8 months of 2016, softwood lumber consumption increased 12.9% from the same period in 2015 and shipments of softwood lumber from western mills increased 2.1% compared with the same period in 2015. The Southern region continues to have the highest levels of production and shipments of softwood lumber.

Total structural panel production increased 2.8% during the first three quarters of 2016 compared with the same period in 2015. Structural panel consumption during the first three quarters in 2016 increased 1.3 million m^3 compared with the same period in 2015, representing a 6.6% increase (APA 2016).

Roundwood production for pulp and wood-based panel mills was 144 million m^3 in 2015, up slightly from 2014. It was forecast that roundwood pulpwood consumption would increase during 2016. Pulpwood supplied from residues could continue to increase in 2016 compared with roundwood because of increased housing construction and the wood products industry. It is also possible that supply from residues could increase with increased demand for residues for producing pellets or biomass for power.

The U.S. lumber and log exports to China have followed a similar pattern, increasing throughout the first 8 months of 2016. The U.S. timber product exports to China have increased compared with the previous year. Lumber exports to China during the first 8 months of 2016 were 15.7% greater than those of 2015, and log exports to China were 17.4% greater than those of 2015 (WWPA 2016).

The U.S. furniture industry production was up 0.6% in August 2016 compared with one month earlier. The weakness in production compared with 2015 is not surprising because sales at furniture stores in August were up just 1.4% and furniture imports were up 6% in 2016 compared with 2015. Employment in the domestic furniture industry has fallen more than 50% since 1999.

General Economic and Major Market Trends

According to 42 forecasters surveyed by FRB (FRB 2016), the U.S. economy grew at a weaker rate during the 2nd quarter than during the 1st quarter of 2016 and expectations of continued growth into 2016 were good. The forecasters expected real GDP to grow at an annual rate of 2.2% in 2017. Continued optimism about the labor market accompanied the outlook for stronger output growth. Average unemployment was forecasted to be 4.9% in 2016. The 42 forecasters expected unemployment to improve to 4.7% in 2017. This decline in unemployment equates to nonfarm payroll employment growing at a rate of 183,700 jobs per month during 3rd quarter 2016 and 169,800 jobs per month during 4th quarter 2016. On an annual-average basis, the forecasters expected job gains of 206,000 per month in 2016 and 173,600 per month in 2017. During the recession from 2007 to 2009, the impact on the job market was 8 million jobs lost in the worst economic downturn since the 1930s Great Depression. Almost every sector experienced job cuts: construction lost 2 million jobs, financial services lost 800,000 jobs, and the auto sector lost thousands of jobs. There were already about 7 million adults looking for full-time employment before the recession hit in December 2007. The U.S. economy must create about 125,000 new jobs per month just to keep up with population growth and to prevent unemployment from rising. The strength of GDP growth is the major determinant of when the U.S. economy reaches full employment.

Core inflation, as measured by the price index for personal consumption expenditures, is expected to average 1.6% in 2016 then increase to 1.8% into 2017. On an annual-average over annual-average basis, inflation in the core consumer price index is projected to remain around 1.8% in 2016 and stay level at 1.9% in 2017 (FRB 2016).

New housing construction slowed during the 3rd quarter of 2016 when 1,142,000 units were started in August at a seasonally adjusted annual rate (NAHB 2016). The decline in August was caused by less single- and multifamily starts. For the 3rd quarter, single-family starts averaged an annual rate of 722,000 units, down 6% from July. Multifamily starts in the 3rd quarter averaged an annual rate of 420,000 units in August, down 5.4% from July. The decline in August was driven by an 18% drop in starts in the South. Starts in the West were down 5.6% in July. Builders remained upbeat because on a 4-month moving average basis, there was an upward trend indicative of the strength in demand for rental housing. Although the authorization of multifamily permits was down in August, the decline occurred entirely in the South, where they were down 17.3% from July. Conversely, the number of permits were unchanged or up slightly in the other three regions of the United States. New single-family units completed decreased slightly in August, falling to 752,000 from July when 754,000 units were completed. Total housing starts for 2016 were forecast to grow to 1,190,000 units, up 7.1% from 2015, and expectations for 2017 are for continued improvement.

In July 2016, the annual rate for total value of all new construction in the United States was $1,153 billion, $17 billion higher than the annual July 2015 value of $1,136 billion (NAHB 2016). For each month from January through July of 2016, the seasonally adjusted annual rate for the total value of new construction was higher than the 2015 annual rate. Residential construction was $445 billion in July 2016, which was $8 billion higher than the $437 billion annual rate of residential construction in 2015. Nonresidential construction accounts for approximately 25% to 35% of all construction value in the United States. It too was affected by the distant economic recession but not as severely as residential construction. Nonresidential construction is typically divided between the construction of buildings (stores, offices, schools, etc.) and structures other than buildings (dams, bridges, etc.). In 2016, construction of buildings, which is the largest market for wood in nonresidential construction, was at an annual rate of $307 billion, unchanged from 2015. The highest rate ever achieved was in 2008 when the construction of nonresidential buildings was nearly $409 billion. The National Association of Home Builders (NAHB) 2016 forecast called for the housing sector to improve in the 3rd and 4th quarter and for starts and sales overall to end the year higher than the 2015 levels (NAHB 2016).

With a large forest resource and high production and consumption of wood products, the United States continues to play an important role in world forest product markets. The United States is a world leader in the consumption of paper and paperboard (about 71 million metric tons in 2015), which is mostly supplied by domestic production and imports from Canada (AF&PA 2016). Domestic paper and paperboard production for the first 8 months of 2016 was about 1.1% lower than the production for the first 8 months of 2015. This decline was mainly reflected in the printing and writing grades of paper as electronic media continues to grab market share from printed media. The U.S. solid wood industry manufactured about 76 million m^3 of lumber and 21 million m^3 of structural panel products in 2015. For the first 8 months of 2016, softwood lumber production was 3.6% higher than the 2015 production, and for all of 2015, structural panel consumption was 4.4% higher than the 2014 levels. The U.S. forest products industry's annual harvest was 446 million m^3 in 2015, exceeding the 445 million m^3 harvested in 2014. Domestic roundwood timber harvest in 2016 that supports domestic consumption is expected to be greater than the 2015 level.

Expenditures for residential repair and remodeling decreased in 2014 to $103 billion, down 22% from the previous year and well below the record high years of 2006

Table 1—Selected U.S. economic indicators, 2013–2017

Indicator	Actual[a] 2013	2014	2015	Estimate 2016[b]	Forecast 2017[c]
Gross domestic product (billion (10^9) 2009 dollars)	15,354	15,583	16,349	16,400	16,701
New housing starts (million units)	0.781	0.925	1.112	1.1	1.133
Mobile home shipments (thousand units)	55	60	71	65	67
Total residential fixed investment (billion (10^9) 2009 dollars)	478	486	530	507	515
Total nonresidential fixed investment (billion (10^9) 2009 dollars)	1,932	1,991	2,209	2,200	2,244
Total industrial production (Index: 2012 = 100)	97.1	99.9	105.2	107.6	110.2
Furniture and related products (Index: 2009 = 100)	108.3	108.7	112.5	114.0	116.0
Paper products (Index: 2009 = 100)	83.7	75.5	95.4	96.0	98.0

[a]Board of Governors of the Federal Reserve System (2016), Council of Economic Advisors (2016), NAHB (2016), U.S. Department of Commerce (2016).
[b]Forest Service estimates based on 2015 actual data and preliminary 2016 data.
[c]NAHB (2014), FRB (2016), and Forest Service estimates.

and 2007. The continued recovery in the housing market is not reflected in residential remodeling, which averaged $100 million monthly for the first two quarters of 2015. This was less than the 2014 average. In 2007, the U.S. Department of Commerce stopped collecting residential repair and remodeling data. The estimates for 2014 and 2015 presented here are Forest Service estimates based on private residential construction expenditures. The NAHB remodeling market index (RMI) fell to 53 in 2nd quarter 2016, down from 59 in 2nd quarter 2015. This index level is higher than the record level in 2004 prior to the housing market crash. During this same period, new residential construction exhibited strength and continued do so into 2nd quarter 2016. Expenditures for maintenance and repairs to all existing residential properties have averaged about 33% of total expenditures, with the remaining 67% for improvements. The unprecedented levels of home foreclosures in the United States in recent years have caused residential improvements and repairs to become a larger part of the economy than usual. Many foreclosed homes needed significant maintenance to become marketable. Expectations are for continued but declining investments in existing residential properties because low mortgage rates keep new home buying attractive.

The three major indicators of demand for wood products—furniture and related products, paper products output, and total industrial production—were lower during the first 9 months of 2016 compared with 2015.

- Industrial production, an important demand determinant for pallet lumber, containerboard, and some grades of paper, decreased 0.6% during the first 9 months of 2016 compared with the annual level for 2015.
- Furniture and related products output, a determinant of high-grade lumber production, was up 0.9% during the first 9 months of 2016.
- Paper products output, a determinant of pulpwood and wood residue use, as well as recycled fiber availability and use decreased during the first 9 months of 2016 compared with the 2015 average. The index (2012 = 100) of paper products output for the first 9 months of 2016 was 1.1% lower than the 2015 average for the comparable time period.

In summary, the housing sector gained strength during the first two quarters of 2016 but weakened somewhat in the 3rd quarter of 2016. This strength is expected to continue into 2017. Housing starts in 2016 will probably significantly exceed levels of the previous year. Even with the slow growth rate in GDP, 2016 was a good year overall as noted by the growth in timber markets. Selected U.S. economic indicators are shown in Table 1.

Timber Products Production, Trade, and Consumption

Statistics and Prospects

Prospects for wood and wood products are shown in Table 2. All volumes are reported in 1,000 m^3. Data for 2016 are preliminary estimates; data for 2017 are forecasts.

U.S. Wood Product Market Shares

Data for U.S. solid wood products production and foreign trade are collected annually by governmental agencies and industry associations. This information provides an overview of how robust the wood-using sectors of the U.S. economy are and how their performance has changed with time (Howard 2016). It does not provide detailed

Table 2–Prospects and statistics for wood and wood products, 2015–2017 (in 1,000 m³)[a]

	2015	2016	2017		2015	2016	2017
	Sawn softwood				Oriented strandboard (OSB)		
Production	53,533	53,804	54,000	Production	11,755	11,900	12,001
Imports	23,701	26,704	28,000	Imports	4,539	4,600	4,666
Exports	2,657	2,707	2,750	Exports	225	200	236
Consumption	74,577	77,801	79,250	Consumption	16,069	16,300	16,431
	Coniferous logs				Particleboard		
Production	129,124	130,000	130,026	Production	4,300	4,370	4,450
Imports	571	525	530	Imports	599	608	622
Exports	8,258	8,304	8,350	Exports	281	290	304
Consumption	121,437	122,221	122,206	Consumption	4,618	4,688	4,768
	Sawn hardwood				Medium-density fiberboard (MDF)		
Production	19,531	19,000	18,750	Production	3,200	3,275	3,333
Imports	980	950	963	Imports	1,475	1,500	1,556
Exports	3,300	2,900	3,000	Exports	350	360	367
Consumption	17,211	17,050	16,713	Consumption	4,325	4,415	4,522
	Hardwood logs				Insulation board		
Production	37,500	37,450	38,000	Production	2,755	2,755	2,755
Imports	1,550	1,575	1,625	Imports	150	177	177
Exports	3,966	3,900	3,800	Exports	129	140	140
Consumption	35,084	35,125	35,825	Consumption	2,776	2,792	2,792
	Coniferous plywood				Roundwood pulpwood		
Production	7,745	7,600	7,432	Production	139,771	139,000	137,899
Imports	943	1,000	1,100	Imports	533	533	533
Exports	564	500	525	Exports	446	446	446
Consumption	8,124	8,100	8,007	Consumption	139,858	139,087	137,986
	Nonconiferous plywood				Hardboard		
Production	1,775	1,800	1,843	Production	741	750	760
Imports	2,260	2,270	2,300	Imports	150	135	140
Exports	227	235	255	Exports	142	120	150
Consumption	3,808	3,835	3,888	Consumption	749	765	750

[a]Data for 2016 are Forest Service linear extrapolated estimates; those for 2017 are Forest Service linear extrapolated forecasts.

information specific to individual end-use markets needed to further evaluate changing patterns of consumption. End-use markets of interest include new single-family, multifamily, and mobile home construction; repair and remodeling of existing residential structures; low-rise nonresidential building and other types of nonresidential construction; furniture and other manufactured wood products; and packaging and shipping. These end-use markets typically account for 80% to 90% of all solid wood products consumption. Market share estimates presented here are based on findings from limited public and private research reports that were related to more readily available annual economic indicator data specific to each end-use market. Consumption was balanced across all end uses, and market shares were developed. These estimates provide a consistent, reliable look at solid wood product markets in the United States (McKeever and Howard 2011).

Table 3 presents annual balanced wood products consumption by end use for sawn wood, structural panels, and nonstructural panels for 2012 through 2015, with preliminary estimates for 2016 and forecasts for 2017. Figure 1 shows market shares for all solid wood products combined for the same time period.

Sawn Softwood

Housing and other construction markets started off strong in 2016 but showed weakness in 3rd quarter 2016. The housing market was likely to finish 2016 at a higher level than recorded the previous year. The housing sector improved as evidenced by its overall increasing market share and had a positive effect on softwood lumber consumption (Fig. 1; Table 3). According to WWPA, during the first 8 months of 2016, softwood lumber consumption increased 12.9% from the same period of the previous year, and shipments of softwood lumber from western mills also increased 2.1% during the first 8 months of 2016 compared with the same period in 2015 (WWPA 2016). Production

Table 3—Wood product market share percentages in the United States, by end use, 2012–2017[a]

	Residential construction						Nonresidential construction			Total	Manufacturing			Packaging	Total,	
	New housing															
Year[b]	New single family	New multi-family	Manu-factured housing	Total	Repair & remod-eling	Total	Build-ings	Other	Total	constr-uction	Furni-ture	Other mfg.	Total	& shipping	reported use	Other
							Sawn softwood[c]									
2012	23	4	1	29	28	57	8	2	10	66	3	6	9	10	86	14
2013	25	5	1	31	27	59	7	2	9	67	3	6	9	10	86	14
2014	25	6	1	32	27	59	7	2	9	68	3	6	8	10	86	14
2015	28	6	1	35	26	61	7	2	9	70	3	5	8	9	87	13
2016	29	7	1	37	26	63	7	2	9	72	3	5	8	9	89	11
2017	30	7	1	38	27	65	7	2	9	74	3	5	8	9	91	9
							Sawn hardwood									
2012	2	1	0	3	6	8	4	11	15	24	10	10	20	46	90	10
2013	2	1	0	3	5	8	3	10	13	21	8	9	17	41	79	21
2014	2	1	0	3	5	8	3	9	13	21	8	9	17	41	79	21
2015	2	1	0	4	5	9	3	9	12	21	8	8	17	41	79	21
2016	3	1	0	4	6	10	4	10	14	24	9	9	18	43	85	15
2017	4	1	0	5	6	11	4	10	14	25	10	10	20	44	89	11
							Total sawnwood									
2012	21	4	1	25	25	50	7	3	10	61	4	7	11	15	86	14
2013	22	4	1	28	24	52	7	3	10	62	4	6	10	15	86	14
2014	22	5	1	28	24	52	7	3	10	62	4	6	10	15	86	14
2015	23	5	1	29	22	51	6	3	9	61	4	6	10	15	86	14
2016	24	6	1	31	22	54	6	3	10	63	4	6	10	15	88	12
2017	25	6	1	32	23	56	6	3	10	66	4	6	10	15	91	9
							Coniferous plywood									
2012	12	2	0	14	30	44	17	3	20	64	5	18	23	7	95	5
2013	14	2	0	16	30	46	17	3	20	66	5	17	22	7	96	4
2014	13	3	0	16	29	46	17	3	20	65	5	17	22	7	95	5
2015	15	3	0	18	29	47	17	3	19	67	5	16	21	7	95	5
2016	15	3	0	18	30	48	17	3	20	68	5	17	21	8	97	3
2017	15	3	0	18	30	48	17	3	20	68	5	17	21	8	97	3
							Oriented strandboard (OSB)									
2012	45	5	3	54	19	73	14	2	16	89	0	1	1	4	95	5
2013	46	6	3	55	18	73	13	2	15	87	0	1	1	4	92	8
2014	47	7	3	58	17	75	13	2	15	90	0	1	1	4	95	5
2015	50	8	3	61	16	77	12	2	14	90	0	1	1	4	95	5
2016	51	8	3	62	17	79	12	2	15	93	0	0	1	3	97	3
2017	52	8	3	63	17	80	12	2	15	95	0	0	1	3	99	1
							Total structural panels									
2012	29	4	2	35	24	59	15	3	18	78	3	9	12	6	95	5
2013	30	4	2	36	24	60	15	2	17	77	3	9	11	5	94	6
2014	31	5	2	38	23	61	15	2	17	78	3	9	11	5	95	5
2015	38	6	2	47	20	67	13	2	16	82	2	6	8	5	95	5
2016	39	6	2	48	21	69	14	3	16	85	2	6	8	5	97	3
2017	40	6	2	49	21	69	14	3	16	86	2	6	7	5	98	2
							Nonstructural panels[d]									
2012	12	4	1	16	14	30	9	0	9	40	21	23	45	1	86	14
2013	13	4	1	18	14	33	9	0	9	42	22	23	44	1	88	12
2014	14	5	1	20	14	34	9	0	9	43	22	22	44	1	89	11
2015	14	6	1	21	14	35	9	0	9	44	23	22	44	1	89	11
2016	14	6	1	22	14	36	9	0	9	45	23	22	44	2	92	8
2017	14	6	1	22	14	36	9	0	9	45	23	22	44	2	92	8

[a]Numbers may not add to totals because of rounding.
[b]2012–2015 revised, 2016 preliminary, and 2017 forecast.
[c]Includes laminated veneer lumber.
[d]Includes particleboard, medium-density fiberboard, insulation board, hardboard, and nonconiferous plywood.

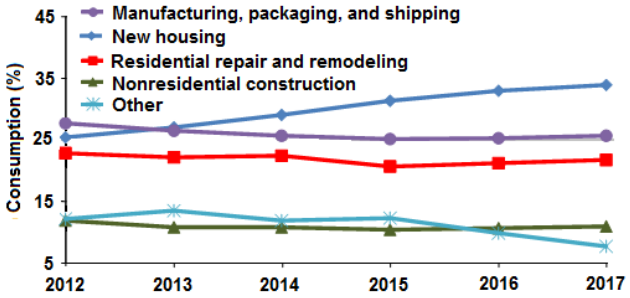

Figure 1—Solid wood timber products consumption market shares, 2012–2017 (2015 total consumption: 132,186 ×10^3 m^3).

increased 4.7% during this period in the South. Apparent consumption for the first 8 months of 2016 was 55.9 million m^3, 11.4% higher than the 49.5 million m^3 for the first 8 months of 2015. As predicted, the U.S. housing construction industry grew during the first half of 2016. Timber production, as a result of a strengthening domestic market, continued to increase in 2016 to slightly higher than the 2015 timber production growth level. Production of sawn softwood for 2016 was forecast to exceed 2015 levels and then continue to rebound with a gradual increase in 2017. Sawn softwood imports increased 34.2% during the first 8 months of 2016 compared with the same time period in 2015. The volume of Canadian imports, which constituted 98% of all sawn softwood imports, increased by 19.3% during this period. Total sawn softwood imports were 22.5 million m^3 in 2015.

During the first 8 months of 2016, U.S. sawn softwood exports increased 1.3% compared with exports for the same period in 2015. Exports to Canada decreased by 3.4%, while exports to china increased 15.7% and exports to Mexico increased 5.9%.

Sawn Hardwood

Sawn hardwood production is expected to decrease to 19 million m^3 in 2016. Imports in 2016 were expected to decrease from the previous year. Given the decrease in U.S. production and imports and despite a strengthening housing market, apparent consumption for 2016 was forecast to fall below the 2015 volume.

Softwood Log Trade

Softwood log exports to China increased by 17.4% during the first 8 months of 2016 compared with exports in the same period of 2015. Softwood log exports to Canada decreased by 12.5% in the same period. Softwood log exports to all other countries decreased by 12.5% during the first 8 months of 2016 compared with the same period of 2015. Most of the U.S. export increase has been centered in Asia. Overall, in 2015, the volume of U.S. logs shipped to China fell by 1,103,700 m^3 to an estimated 2.1 million m^3, or about 51% of the region's total log production. Softwood log imports decreased by 32% during the first 8 months of 2016 compared with the previous year. During 2015, the timber harvest surpassed the 2014 harvest, and the forecast called for a further rise in harvest in 2016.

Hardwood Log Trade

Hardwood log exports increased by 0.4% and imports rose by 3.3% during 2016 compared with 2015. Canada traditionally provides about 95% of U.S. hardwood log imports. The trend in hardwood log exports was down from a year ago through the first 8 months of 2016. Hardwood log imports were also up slightly through the first 8 months of 2016 compared with 2015.

Pulpwood

Roundwood production for pulp and wood-based panel mills was 139 million m^3 in 2016, down slightly from 2015. Roundwood pulpwood consumption was expected to decrease during 2016 as indicated by a 1.1% decline in paper and paperboard production during the first 7 months of 2016. Pulpwood supplied from residues continued to decrease relative to roundwood. This is a result of declining residual production and competition for residuals for pellets and biomass and not based on preference on the part of pulp producers. The residue portion of pulpwood was 21 million m^3 in 2015, up slightly from 2014 (Howard 2016). Trade patterns have continued to significantly impact paper and paperboard production and have affected pulpwood use, but the significant decline in U.S. paper and board production and consumption that occurred over the past decade was largely caused by a downturn in consumer spending associated with the United States and global recession. Exports of paper, paperboard, and converted products decreased by 5.1% to 8.8 million metric tons, whereas imports of paper and paperboard decreased by 4.4% to 7.8 million metric tons during the first 7 months of 2016. Paper and paperboard production decreased by 1% in 2015 falling to 72.3 million metric tons. The production of paper and paperboard in 2016 was forecast to be down from 2015 production as reflected in the annual year-to-date rate for July 2015 of 47.3 million metric tons, which is down 1.1% from 2015 when paper and paperboard were produced at a level of 47.9 million metric tons.

Structural Panels

Structural panel production in 2015 was basically unchanged from 2014, whereas consumption in 2015 was 4.4% higher than consumption in 2014 (APA 2016; Elling 2015). Structural panel production during the first three quarters of 2016 was 15.2 million m^3, which was 2.8% higher than the first three quarters of 2015. Structural panel market shares move in the same direction as any economic downturn. New residential construction, which in 2006, captured 46% of all structural panel consumption, fell to

35% in 2011, but it was expected to rebound and continue increasing in 2016 (Table 3).

In 2015, 11.8 million m^3 of oriented strandboard (OSB) were produced (APA 2016) (Table 2). And, in 2015, OSB consumption totaled 16 million m^3 and constituted 60% of the structural panel market (Table 3). This represented a 4% market share increase from 2008. Consumption was expected to further increase in 2016. OSB consumption increased 6.7% during the first three quarters of 2016. The continuing economic growth and growing residential construction sector was expected to increase OSB consumption in 2016 to 16.3 million m^3.

Softwood plywood production was 7.7 million m^3 in 2015 (Table 2) (APA 2016). This level of production was slightly less than that of 2014. The volume of softwood plywood production fell throughout the 1990s, and the decline continued into 2012 before improving in 2013 and then declining again in 2014. Softwood plywood imports decreased in 2015 by 3.9% compared with that of 2014, whereas softwood plywood exports in 2015 declined by 3.5% compared with that of 2014. Plywood exports to Canada increased by 22.6% during the first two quarters in 2016 compared with the previous year, and plywood imports from Canada decreased 31.7%. Softwood plywood consumption was 6.5 million m^3 at the end of 3rd quarter 2016, which was 6.3% higher than the previous year. Apparent consumption of softwood plywood increased 2.2% in 2015 compared with 2014.

Hardwood Plywood

Hardwood plywood production, including core material such as particleboard and medium-density fiberboard (MDF), was estimated at 1.7 million m^3 in 2015, up slightly from 2014 production. Hardwood plywood imports increased 4.1% in 2015 climbing to 2.3 million m^3 compared with 2014. Hardwood plywood exports rose in 2015, increasing 7.8% to 222,000 m^3. Production and consumption of hardwood plywood in 2015 and 2016 was forecasted to steadily rise (Table 2). These increases are a result of rising total industrial production and furniture and related products production (Table 1), coupled with the U.S. housing market rebound.

Particleboard and Medium-Density Fiberboard

Information from the Composite Panel Association (CPA 2016) indicates that both particleboard and MDF production increased in 2015 compared with 2014. Particleboard production was 4.3 million m^3, an increase of nearly 2%; MDF production was 3.2 million m^3, an increase of nearly 9% (Table 2). Both imports and exports of particleboard and MDF increased in 2015 compared with 2014, resulting in increased total consumption in 2015 compared with 2014. Particleboard and MDF account for well over half of all nonstructural panels consumed in the United States, being used principally for furniture, fixtures, millwork, and other manufactured products. Markets for particleboard and MDF were expected to increase modestly in 2016 (Table 3).

Hardboard

Based on data from the CPA (CPA 2016), 741,000 m^3 of hardboard were produced in 2015 in the United States and Canada; this level of production was expected to increase slightly in 2016. Hardboard imports and exports are expected to remain flat during the next two years.

Insulation Board

Information from the American Forest & Paper Association (AF&PA 2016) showed that 2.7 million m^3 of insulation board were produced in 2015, unchanged from 2014. Production of insulation board has been flat for several years, resulting in a stable level of apparent annual consumption of about 3 million m^3.

Fuelwood

With data from the 2015 Energy Information Administration report (EIA 2015) and adjusting for the 2015 winter weather and an increasing trend in fuelwood use per household, fuelwood consumption was estimated to be 44 million m^3 in 2015, an increase of 2.4% from 2014. Households use most fuelwood for heating and aesthetic enjoyment. Some forest products manufacturing facilities use mill residues rather than roundwood for fuel. A small portion of roundwood fuelwood is used for electric power production. Use for heat and/or electricity production is limited by the low cost of coal and natural gas alternatives. Fuelwood consumption for 2015 was greater than the level for 2014, and the forecast called for increased fuelwood consumption through 2016. Renewable fuel standards and other biomass-related energy policies are unlikely to increase the growth rate for fuelwood production and consumption but are likely to increase other forms of wood energy use such as pellets. The United States produced 6.9 million metric tons of wood pellets in 2014, of which about 42% were consumed domestically (UNECE/FAO 2015, p. 96-99).

Forest Products Prices

Trends in the wholesale price of forest products are different across two broad categories: lumber and wood products (such as wood-based panels) and pulp and paper products (Fig. 2). Throughout the late 1990s, the producer price of lumber and wood products as reflected by the producer price index (PPI) continued to fluctuate around a level reached by the mid1990s before peaking during the second half of 1999 (U.S. Department of Labor 2015). The PPI for lumber and wood products continued to decrease during the 1st quarter of 2008, but rose and peaked in the 3rd quarter, and then declined again in the 4th quarter. In 2009, the PPI for

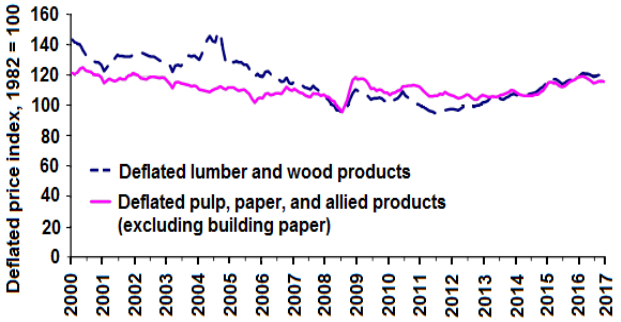

Figure 2—Wholesale prices of forest products, 2000–2017.

lumber was down 7.3 points from 2008. Changes in the price of softwood lumber and a depressed lumber market accounted for much of this change and most of the volatility in the index. In 1999, the deflated composite price index reached an all-time high (at a level more than 50% higher than that of the base year, 1982), followed immediately by a sustained decline that continued throughout 2000 and into 2011. The PPI for both lumber and pulp, paper, and allied products have been increasing since 2011, throughout 2015, and into 2016. Because of these sustained low prices, U.S. demand for lumber and wood products during 2000 and into 2005 remained near record levels. But the current strengthening in the housing market has caused an uptick in the price levels and has fueled the current resurgence in lumber and wood products demand. In contrast, the PPI of prices in the pulp and paper sector has exhibited considerably less short-term volatility. In deflated terms, the composite index began in 2008 with a flat to declining trend, before undergoing an upturn in 3rd quarter 2008 that became flat in 1st quarter 2009. It then fluctuated throughout 2013 before increasing in 2014 and then declining into 2015. During the first two quarters of 2016, lumber prices were steady to increasing, whereas paper and paperboard prices showed a slight decline.

Policy Initiatives

Wood Energy

The wood energy market in the United States is composed of four major sectors: industrial (68%), residential (20%), electricity (9%), and commercial (3%). The industrial sector represents the wood products and pulp and paper industries, and the amount of wood energy it consumes has been mainly linked to wood product output rather than public policies. Public policy at the state and federal level has been focused on the other three sectors. Historically, public policy focused on promoting the use of biomass for electricity. However, in recent years, there has been a shift to greater support for liquid fuels for transport.

The most effective federal incentives introduced since 2004 according to recent publications appear to be (a) the renewable energy production tax credits, (b) clean renewable energy bonds, (c) qualified energy conservation bonds, and (d) investment tax credits (Aguilar and others 2011). All these incentives are tailored to the electricity generation sector. Recent publications also suggest that the eligibility of open-loop biomass plants (that is, not relying on bioenergy-dedicated crops but instead on material harvested from working forests and industry coproducts) for renewable energy production tax credits have favored the greater use of woody materials, especially in the electricity sector.

Biomass Crop Assistance Program (BCAP) implementation guidelines (section 9.4.1.2) have been recently updated. BCAP, a policy established to help meet U.S. federal renewable fuel standards, mandates increased national biofuel use to reach 36 billion gallons per year by 2022, with 21 billion gallons per year from advanced biofuels (Energy Independence and Security Act 2007) (1 billion = 10^9).

Wood pellet manufacturing is the most dynamic wood energy sector in the United States because of increases in capacity and production of industrial pellets for export to the European Union (EU). The EU bioenergy demand and supply are influenced by policies that seek to ensure that use of biomass for energy results in real greenhouse gas (GHG) emission reductions and does not imperil the sustainability of bioenergy feedstock. U.S. export capacity has increased from less than 100,000 metric tons in 2008 to more than 3 million metric tons in 2015 coming from the newly operating regional pellet plants in the U.S. Gulf Coast region, according to the North American Wood Fiber Review (Wood Resources International 2016). In 2016, North American overseas pellet exports increased to a new quarterly high with Canadian exports leading the way. North American overseas pellet exports bounced back from the previous quarter's decline increasing to a new record of 1.74 million metric tons in 2nd quarter 2016. This represented a 5% increase from the previous quarter and a 24% increase from the same period of the previous year. U.S. pellet exports fell for the second consecutive quarter in 2nd quarter 2016, falling 5% from the previous quarter to 1.14 million metric tons. The U.S. overseas pellet exports are nearly all flowing to Europe, principally to the UK, from the U.S. South industrial pellet sector. In the United States, pellet exports to Europe, which had been growing with 12 consecutive quarters of volume increases, declined 6.2% to 1,210 metric tons in the 1st quarter and continued to decline falling to 1.14 million metric tons in 2nd quarter 2016 (Wood Resources International 2016).

The Pellet Fuels Institute was created as a North American trade association to promote energy independence through efficient use of densified biomass fuel.

It has become clear that falling oil prices have affected the forest products and bioenergy sector, because a number of pulp mills are returning to use of less expensive natural gas instead of woody biomass, slowing the use of that material. Decreased diesel prices for harvest and transportation resulting in lower delivered wood costs is a positive result from the drop in fossil fuel prices.

Biomass Energy

Renewed growth in the world economy has had a significant impact on wood and energy demand with the near-term future of U.S. wood and energy markets tied to the U.S. domestic upturn from the recession that started in 2008. U.S. energy concerns have led to growing concern about GHG emissions along with their effect on climate change and its effect on energy investment decisions, such as increasing use of renewable fuels, increasing production of unconventional natural gas, the shift in the transportation fleet to more efficient vehicles, and improved efficiency in end-use appliances. Continued improvement of the world's financial markets is especially important for the wood and energy supply outlook because the capital-intensive nature of most large projects makes access to financing a critical necessity.

Although the electricity sector has been a major beneficiary of federal public policy support, it has recently been facing increased scrutiny because of GHG emissions. Whether power generation using woody feedstock is a GHG carbon-neutral option is undergoing debate. On January 12, 2011, the U.S. Environmental Protection Agency (EPA) announced its plan to defer for 3 years the requirement for GHG permits for CO_2 emissions from biomass-fired and other biogenic sources (EPA 2011b). Since the deferral in 2011, electricity and heat production is 25% of GHG emissions; industry 21%; agriculture, forestry, and other land use 24%; transportation 14%; building 6%; and other energy 10%. These are percentages of the 2010 GHG emissions (IPCC 2014).

The EPA has been developing guidelines to restrict emissions from certain stationary sources, such as electric power plants. The EPA has suggested the possibility that emissions from biomass might be treated on the same terms as emissions from fossil fuels. At the same time, it recognized the uncertainty about the carbon offset benefits of wood and other biomass sources (EPA 2010). Biogenic CO_2 emissions being reviewed include diverse sources such as those derived from combustion of biological material, including all types of wood and wood coproducts, forest residues, and agricultural material (EPA 2011a).

The U.S. Energy Information Administration has released the 2017 edition of its Annual Energy Outlook (EIA 2017), which predicts that total renewables used in the electric power generation sector will increase by 1.2% in 2016. Across all sectors, the United States is expected to consume 1.980 quad of wood biomass in 2016, down from 2.041 quad in 2015. Consumption is expected to fall to 1.998 quad in 2017. Across all sectors, the United States is also expected to consume 0.502 quad of waste biomass in 2016, up from 0.494 quad in 2015. In 2017, consumption of waste biomass is expected to increase to 0.511 quad.

Softwood Lumber Agreement

On October 12th, 2015, the Softwood Lumber Agreement (SLA) ended except for a clause prohibiting the filing of a new trade case for one year. An immediate renewal of the agreement was in the works. Absent a renewal, Canadians had at least one year of unrestricted access to the U.S. lumber market. In North America, U.S. mills outperform Canadian mills in overall earnings, which has been occurring since 2008, which hints that managed trade under the SLA was a key factor. Sawmills in the U.S. West performed well in 2015 and into 2016, but earnings were lower than in the U.S. South and were more similar to the earnings results achieved by Canadian mills (Spelter 2015). Since the one-year "standstill period" that followed the expiration of the SLA ended in October, the U.S. Lumber Coalition is now legally able to file duty petitions against Canadian lumber imports. No petitions have been filed to date.

Summary of Timber Products and Energy Policy

The U.S. economy showed strength during the first three quarters of 2016 as evidenced by the increase in real GDP growth of 2.3% in 3rd quarter 2016, which signaled renewed strength in major sectors of the economy. With continued GDP growth during the first half of 2016, resulting partly from the continued improvement in the housing sector as reflected in the rise in building permits, increasing employment, and renewed confidence about the financial system, there was increased enthusiasm for good economic conditions into 2017. With the Federal Reserve's announcement of the 25 basis point increase in the federal funds target range, the Federal Open Market Committee (FOMC) forecast of expected real GDP growth was released (APA 2016). Also, with more new home purchases instead of home refinancing and stronger GDP growth, which is an indicator of employment growth, the recovery of the U.S. economy appears steady but not robust. The current inflationary pressures remain in check, and unemployment is falling, leading to higher expectations for the U.S. economy. The biggest near-term impact from the improving U.S. economic activity in 2016 is the fallout from rising bond rates, resulting in the strengthening of the dollar. This could be a challenge for U.S. manufacturers. The future strength for other domestic and foreign trade sectors of the wood products industry also depends on the general economy, future lumber prices (which were stronger in 2016), the improving housing sector, and the value of the

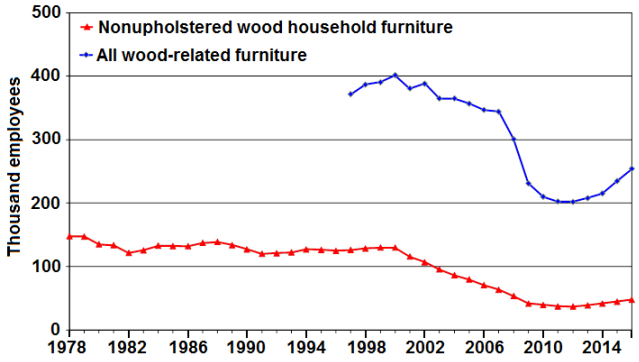

Figure 3—Employment in the wood furniture industries, 1978–2016.

dollar. U.S. timber exports to China were strong in 2015 and showed continued strength during the first 8 months of 2016. The future strength of the U.S. trade sector is also buoyed by surging exports to Mexico. If the surge in exports to Mexico is sustained and if the housing market continues to rebound, 2017 could be a good year for the U.S. wood industry. As the world works to replace fossil fuels, wood pellets are playing a key role in decarbonizing power grids. European nations, in particular, have invested heavily in pellets for both heating and electricity generation. To supply this increased demand, global trade in pellets has doubled since 2012 with the United States playing a key role.

The U.S. furniture industry, in retreat since 1999, continued declining in 2011 as low-cost furniture imports and the global economic recession eroded the domestic industry market share. Employment in the domestic furniture industry has fallen more than 50% since 1999 (Fig. 3). The U.S. furniture industry stabilized in 2012 and has shown continued growth into 2016 with production growing about 2.9% at an annual rate for wood-related furniture, as shown in both furniture categories in Figure 3.

Literature Cited

AF&PA. 2016. Paper, paperboard, and wood pulp—Monthly statistical summary. August. Washington, DC: American Forest and Paper Association.

Aguilar, F.X.; Song, N.; Shiftley, S. 2011. Review of consumption trends and public policies promoting woody biomass as an energy feedstock in the U.S. Biomass & Bioenergy. 35: 3708-3718.

APA. 2016. Engineered wood statistics, third quarter 2016. Tacoma, WA: APA – The Engineered Wood Association. 9 p.

Board of Governors of the Federal Reserve System. 2016. Statistical releases and historical data. Industrial production and capacity utilization - G.17. Washington, DC. http://www.federalreserve.gov/releases/G17/Current/table1.htm (2/23/2016).

CPA. 2016. Particleboard and medium-density fiberboard annual production and shipments. [Annual]. Silver Spring, MD: Composite Panel Association.

Council of Economic Advisors. 2016. Economic indicators. September. Washington, DC: United States Government Printing Office. https://www.whitehouse.gov/administration/eop/cea/economic-indicators. (2/23/2016).

EIA. 2017. Annual energy outlook 2017 with projections to 2050. DOE/EIA-0383(2017), January 2017. Washington, DC: U.S. Energy Information Administration. www.eia.gov/forecasts/aeo.

Elling, J. 2015. 2014-2019. Market outlook & regional production structural panel & engineered wood products. APA Economics Report E81. Tacoma, WA: APA – The Engineered Wood Association. 75 p.

Energy Independence and Security Act. 2007. 121 Stat. 1492; 42 U.S.C. 17001 (note).

EPA. 2010. Prevention of significant deterioration and Title V greenhouse gas tailoring rule. Washington, DC: U.S. Environmental Protection Agency. www.epa.gov/nsr/documents/20100413final.pdf. (11/06/2012).

EPA. 2011a. Fact sheet: proposed rule – Deferral for CO_2 emissions from bioenergy and other biogenic sources under the prevention of significant deterioration (PSD) and Title V programs. www.epa.gov/nsr/ghgdocs/biogenicfs.pdf. (11/06/2012).

EPA. 2011b. Guidance for determining best available control technology for reducing carbon dioxide emissions from bioenergy production. March. Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation. http://www.epa.gov/nsr/ghgdocs/bioenergyguidance.pdf. (11/06/2012).

FRB. 2016. Survey of professional forecasters, fourth quarter 2016. Philadelphia, PA: Federal Reserve Bank of Philadelphia. http://www.phil.frb.org/research-and-data/real-time-center/survey-of-professional-forecasters/. (2/11/2016).

Howard, J.L.; Jones, K.C. 2016. U.S. timber production, trade, consumption, and price statistics, 1965–2013. Res. Pap. FPL–RP–679. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 100 p.

IPCC. 2014. Climate change 2014 synthesis report: summary for policymakers. Geneva, Switzerland: Intergovernmental Panel on Climate Change. 32 p. https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

McKeever, D.B.; Howard, J.L. 2011. Solid wood timber products consumption in major end uses in the United States, 1950–2009: a technical document supporting the Forest Service 2010 RPA Assessment. Gen. Tech. Rep. FPL–GTR–199. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 41 p. http://www.treesearch.fs.fed.us/pubs/39746. (2/23/2016).

NAHB. 2014. Executive-level forecast. David Crowe. Eye on the economy. Washington, DC: National Association of Home Builders. http://www.nahb.org/reference_list.aspx?sectionID=869&channelID=311. (10/20/2014).

NAHB. 2016. Housing economics. Washington, DC: National Association of Home Builders. https://www.nahb.org/en/research/housing-economics.aspx. (2/23/2016).

Spelter, H. 2015. Topic of the month. The SLA ends, then what? Lumber Markets Status and Trends. 11: 6. Littleton, MA: Forest Economic Advisors.

UNECE/FAO. 2015. Forests products annual market review, 2014-2015. United Nations Economic Commission for Europe and the Food and Agriculture Organization. http://www.unece.org/forests/fpamr2015.html. (2/23/2016).

U.S. Department of Commerce. 2016. Manufacturing & construction statistics. Washington, DC: U.S. Department of Commerce, Bureau of the Census. http://www.census.gov/mcd/. (10/23/2016).

U.S. Department of Labor. 2015. Producer prices and price indexes. (Monthly and annual). Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics. http://www.bls.gov/ppi. (10/2/2015).

Wood Resources International. 2016. North American Wood Fiber Review. 19: 3. ISSN 1098-5093. Woodinville, WA: Wood Resources International, LLC. www.woodprices.com.

WWPA. 2016. Lumber track. (Monthly). November. Portland, OR: Western Wood Products Association.