

Market Outlook & Regional Production

2023 – 2024



MARCH 2023



MARKET OUTLOOK & REGIONAL PRODUCTION

STRUCTURAL PANELS & ENGINEERED WOOD PRODUCTS

2023 – 2024

E88

Members Edition

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Executive Summary

The policy priority of central bankers in the U.S., Canada, and Europe is to take the steps they feel needed to bring inflation down to a sustainable rate of 2%. Hence, they remain on a path of tightening monetary policy by raising their short-term policy rates and reducing their holdings of a variety of long-term financial securities. Although they will not admit it, there is considerable uncertainty concerning how high and the length of time before they start to cut their policy rates.

The yield curves in the U.S. and Canada are inverted with the yield on 3-month government bills exceeding the yield on 10-year government bonds. Historically this has been a leading indicator of recession. This is the supporting evidence for some economists in both countries to be calling for recessions beginning in the second or third quarters of this year. The tightening of monetary policy in the U.S. has led to a contraction in the money supply. This is the supporting factor for those economists that fall into Monetarist Camp say inflation will fall faster than what policy makers at the Federal Reserve expect and lead to a severe recession in the second half of 2023.

The return of the rate on a 30-year fixed-rate mortgage into the 6–7% range in the U.S. is likely where it will run through 2023, if not higher. This means the affordability problem will persist through 2024. Reflecting this, 80% of the respondents to the Fannie Mae survey regarding home buying conditions say this is a bad time to buy. New and existing, will remain at low levels for at least the next 12 months. There are 950,000 multifamily units under construction, record high. Lending standards for multifamily construction are being tightened. The mix of the affordability challenge and the record number of multifamily units under construction point to housing starts running in the 1.25–1.35 million range through 2024, split by single-family starts of 785,000–825,000 units and multifamily starts of 450,000–500,000 units.

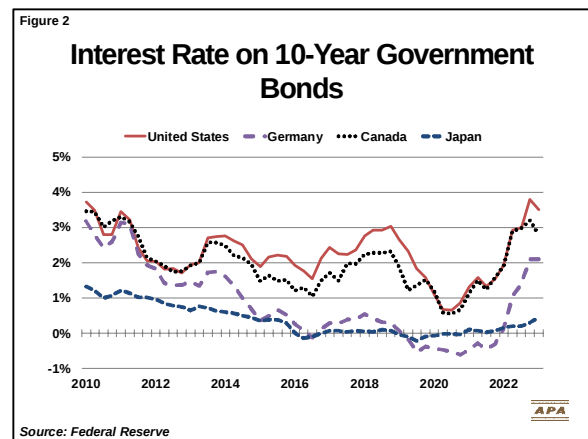
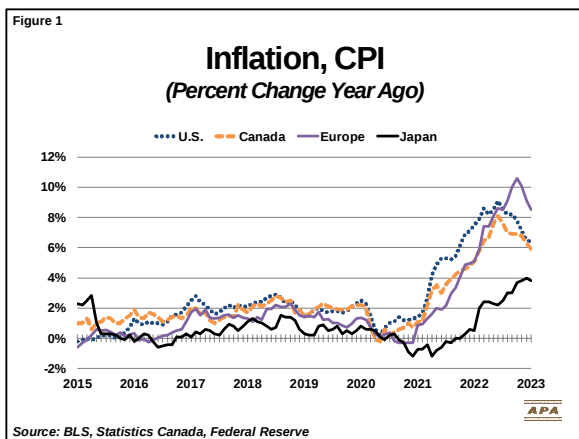
The message regarding the other end-use markets for structural panels and engineered wood products is unchanged from the Fall 2022 Outlook; it is going to be challenging. Discretionary repair and remodeling projects are going to be put on hold. Manufacturing will be in a recession, especially the recreational vehicle industry. Some segments of nonresidential construction will be recovering, but from deep holes.

Structural panel production in North America is projected to fall to 30 billion square feet in 2023, with a modest increase to a little over 31 billion square feet in 2024. Engineered wood products will follow the decline in residential construction with I-joist and LVL production falling to levels not seen since the middle part of the prior decade.

The Economy

Before discussing the U.S. and Canadian economic outlooks, we start with a look at the recent inflation and long-term interest data for selected major economies. Based on the respective consumer price indices, inflation on a year ago month basis peaked in the second half of 2022. (Figure 1.) However, the timing of the peaks occurred at different months. Europe has received relief because the winter has not been as cold as feared, so energy prices have eased. Regardless of inflation appearing to have peaked, central bankers have not seen enough evidence to divert them from their paths of tightening monetary policy to meet their goals of sustainable low inflation. In the U.S., Canada, and Europe, the stated goal is 2%.

The tightening of monetary policy has contributed to the rise in the yields on 10-year government bonds in the selected countries as shown in Figure 2. Even Japan now has positive nominal interest rates. However, the current yields in all these countries are negative when adjusting for inflation. In evaluating forecasts of where these yields will be through 2024 relative to inflation, the prevailing view seems to be that the nominal rates will just barely be greater than inflation. If we accept the notion that the accommodative monetary policy pursued across the world was a one-off for the prior decade, then using that period as a guide for forecasting long-term rates could prove to be optimistic.

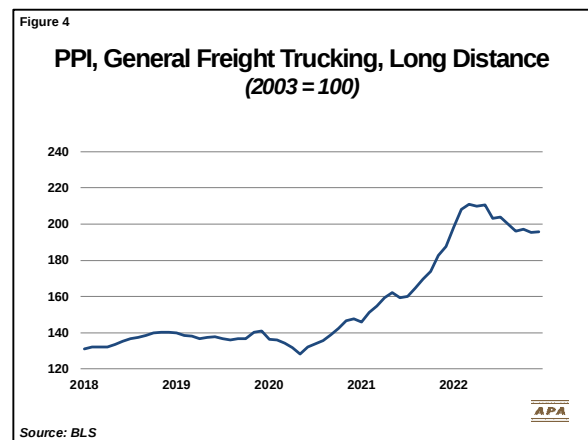
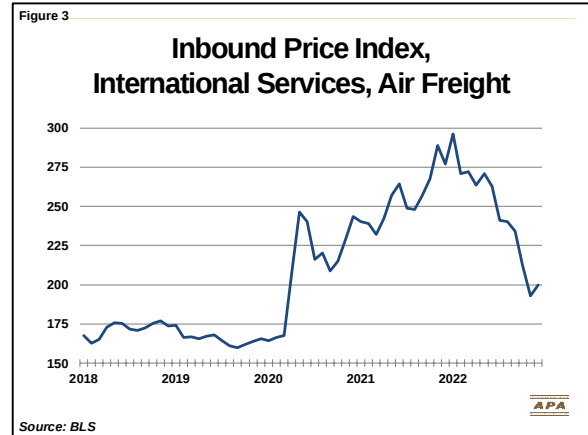


United States

Following the decline in the first half of 2022, real gross domestic product (GDP) averaged growth at a seasonally adjusted annual rate of 3% in the second half of 2022. The rebound was driven by businesses rebuilding inventories and an improvement in net exports. Consumer spending in the second half averaged an annualized growth of 2.0%, slightly greater than the first half rate of 1.6%. Business investment in the second half averaged an annualized growth rate of 5.5%, up from 2.3% in the first half. The fall in homebuilding and sales subtracted from the real GDP estimate in the second half. The residential investment component of the real GDP estimate averaged an annualized rate of decline of 27% in the second half of 2022.

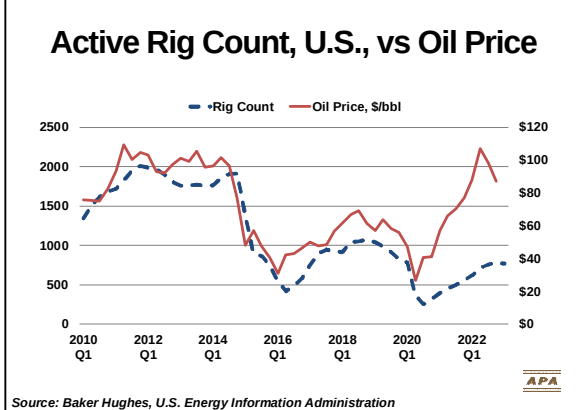
Disinflation process underway

In recent statements, Federal Reserve Chair Jerome Powell has said the disinflation process in the U.S. economy is underway. Evidence that some supply chain disruptions caused by the COVID outbreak are being resolved include lower prices of international inbound air freight and general freight long distance trucking. (See Figures 3 and 4.) In the case of trucking, the decline in price has been small.



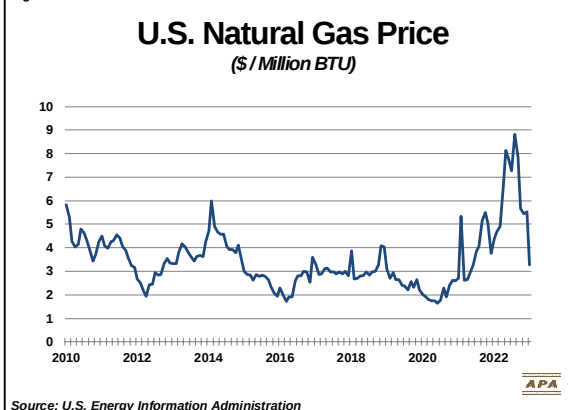
Energy prices have also come down from their peaks of last year. As shown in Figure 5, the acquisition cost of oil as paid by refiners has fallen from an average of \$107/barrel in the second quarter of 2022 to an average of \$87/barrel in the fourth quarter of 2022. Despite higher prices, the rig count for exploration and development remains well below what the historical relationship would have predicted.

Figure 5



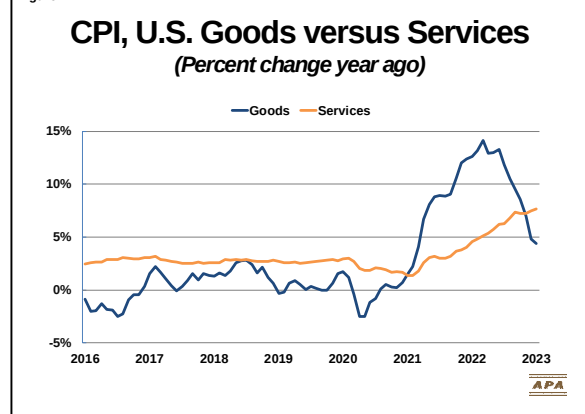
A future concern is the reduction in the nation's Strategic Petroleum Reserve (SPR) that has taken place. Under President Biden's executive order in November 2021, the government started selling oil out of the SPR. These sales increased in March 2022. The SPR volume has been reduced from 650 million barrels in November 2021 to 380 million barrels in January 2023. Favorable weather so far this winter has resulted in lower demand for natural gas. In addition, domestic supply held up because an LNG export port was not operational. The price of natural gas has fallen 63% from the peak it reached in August of 2022. (See Figure 6.)

Figure 6



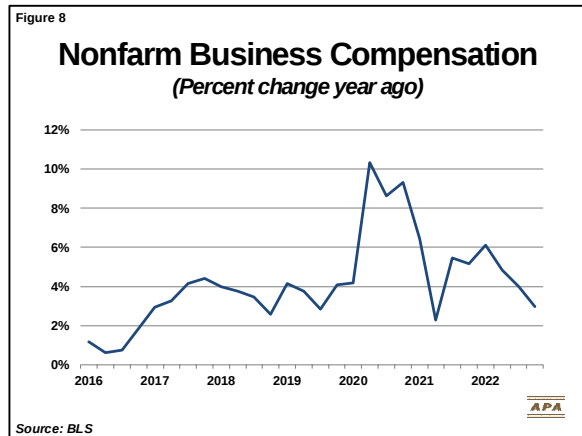
However, it is not necessarily smooth sailing on the inflation front. As shown in Figure 7, the inflation rate for goods has come down from near 15% to 5%. On the services side though, the inflation rate has been on the rise. Some of this stems from the way the housing component is measured. Services have a higher labor cost content than goods, so slowing in services inflation will be more difficult to achieve.

Figure 7

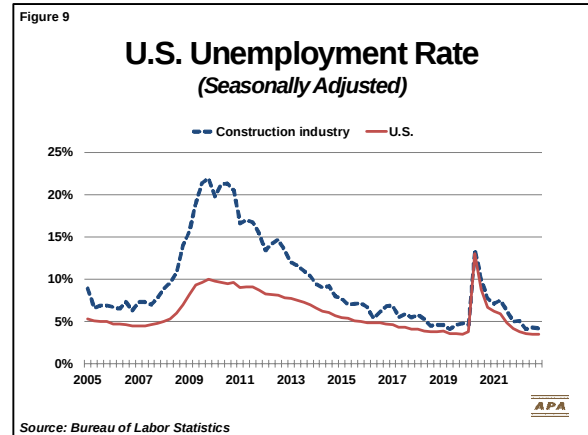


Federal Reserve focus on labor market

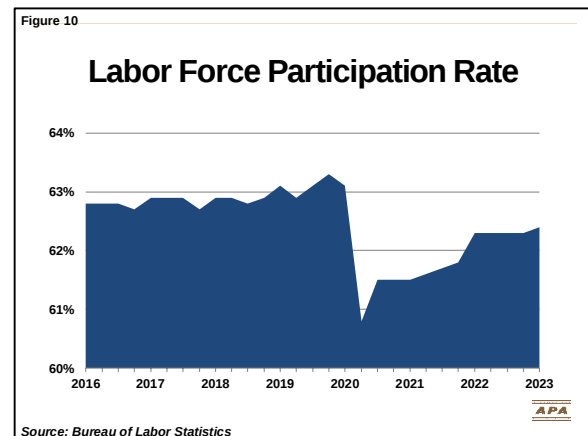
Jerome Powell and other members of the Federal Reserve Board and regional bank presidents have stated that for inflation to return to their sustainable 2% target, they need to see slower wage growth or a meaningful pick-up in labor productivity. There is some evidence that is occurring. Nonfarm business compensation growth has slowed to 3% on a year ago quarter basis (See Figure 8.). Average hourly earnings growth has slowed from 6% to 4.4% in January 2023.



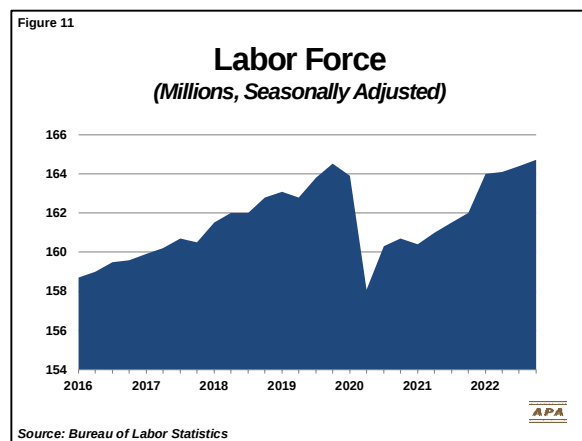
With that said though, there are other measures saying the labor market remains very tight, so slower wage growth is not inevitable. The unemployment rate is at an historic low in total and especially in the construction industry, as seen in Figure 9.



Labor force measures are not encouraging. Using the January and February estimates of the labor force participation rate as a proxy for the first quarter, it has edged up by 0.1 percentage point to 62.4%. (See Figure 10.) Yet, it remains almost one percentage point below the pre-COVID rate.

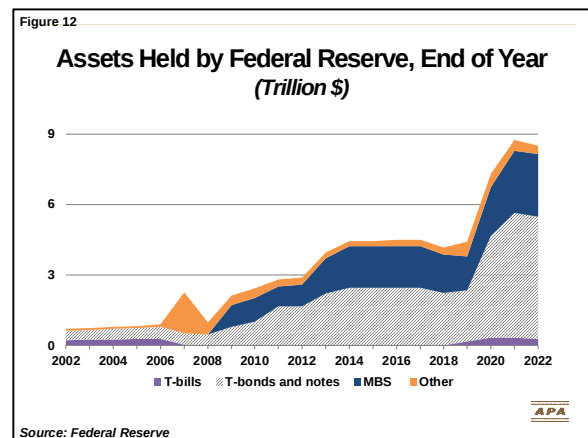


The number of people in the labor force in the fourth quarter of 2022 was finally above that of the first quarter of 2020, which is when the coronavirus hit. (See Figure 11.) Job openings continue to run at historically high levels in many industries. Consistent with this statement, in January, 45% of small business owners reported job openings were hard to fill, up four percentage points from December 2022.

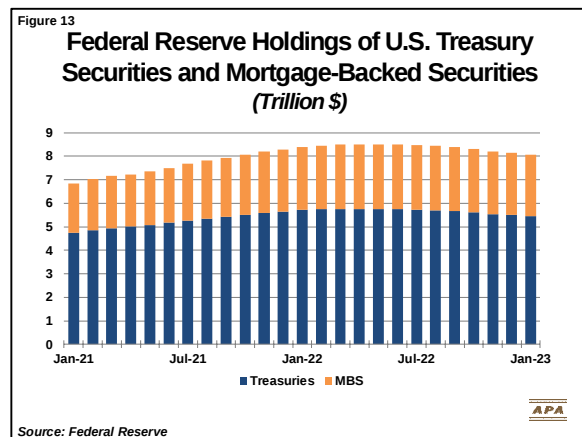


Federal Reserve reducing asset side of balance sheet

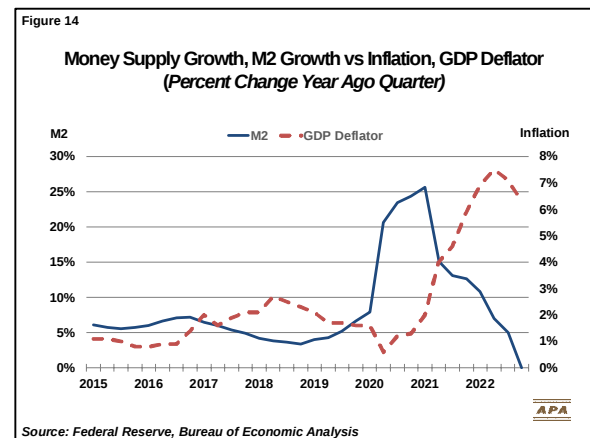
Not only is the Federal Reserve tightening monetary policy by raising the target range of the federal funds rate, in mid-2022 it started to reduce the asset side of its balance sheet. As background again, since the beginning of the Financial Crisis of 2007–08, the Federal Reserve has pursued its nontraditional means of supporting the economy through the purchase of long-term Treasury bonds and notes and mortgage-backed securities. (See Figure 12.) From 2008 to 2013, the Federal Reserve added \$2 trillion and \$1.75 trillion of Treasuries and mortgage-backed securities to its balance sheet, respectively. To support the U.S. economy through the dislocations created by the onset of the coronavirus in 2020, the Federal Reserve added another \$3 trillion of Treasuries and \$1.75 trillion of mortgage-backed securities to its balance sheet.



Shown in Figure 13 is the near-term history of the Federal Reserve's holding of Treasuries and mortgage-backed securities. From June 2022 to January 2023, the Federal Reserve has reduced its holdings of Treasuries by \$320 billion and mortgage-backed securities by \$100 billion. Jerome Powell has said the Fed is going to accelerate the rate at which it reduces the holdings of Treasuries and mortgage-backed securities and will do this over the next two years. This drawdown adds uncertainty regarding the path of long-term interest rates through 2024.

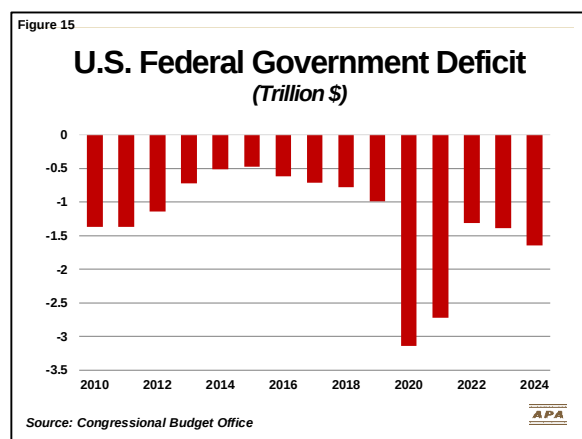


At the end of 2020 we pointed out that the easy monetary policy pursued in 2020 led to unprecedented growth in the money supply, as measured by M2, and that higher inflation was likely to follow. That has been the case as shown in Figure 14. Since the Fed began to tighten policy in mid-2022, money supply growth slowed to zero on a year ago quarter basis by the fourth quarter of 2022. This has led to several economists to say inflation is likely to fall faster than what policymakers at the Fed believe and this will also lead to a recession by the second half of 2023.



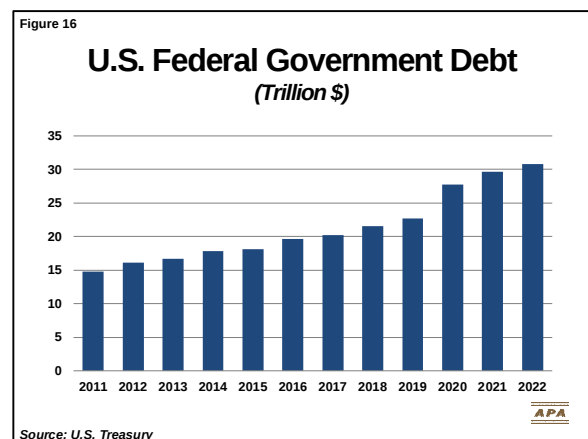
Dealing with the Federal government deficit and debt ceiling

The other policy issue causing concern is what type of compromise will the Biden administration and the Republican led House of Representatives generate over the next few months to deal with the budget deficit and debt ceiling. The Congressional Budget Office (CBO) recently released its economic and budget deficit projections for the next 10 years. Based on their set of assumptions for economic growth, interest rates and existing law, CBO projects a budget deficit of \$1.35 trillion in 2023 and \$1.65 trillion in 2024. (See Figure 15).

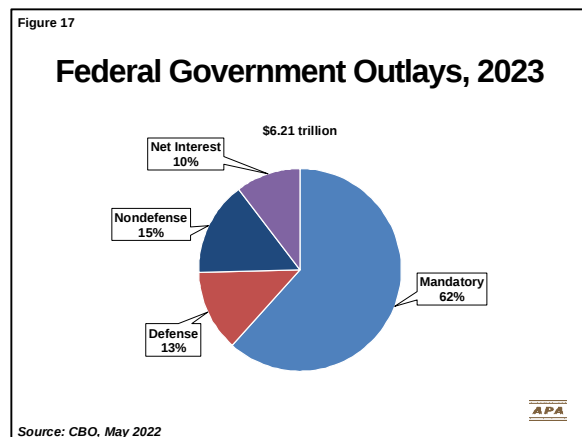


With respect to the interest rate assumptions made by the CBO staff, they are likely to be too optimistic. Jerome Powell has said that he and policy makers at the Fed anticipate that nominal interest rates in the future will exceed inflation. This is more consistent with history prior to the last 15 years. The CBO staff assumption is that short-term interest rates will equal inflation of near 2%. However, as the weighted average of the yield on U.S. government securities increases due to higher interest, an increase of just 0.5% on outstanding debt of \$35 trillion plus adds \$175 billion to annual interest costs.

In January 2023, the federal government hit the debt ceiling limit of \$31.4 trillion. As shown in Figure 16, the total debt of the federal government doubled from 2011 to 2022. Treasury Secretary Janet Yellen has said the Treasury can do some maneuvering to keep the federal government open for a few months before temporary adjustments in spending would have to be made. By law, the federal government cannot default on its debt servicing obligations, so that will not occur if no agreement is reached by mid-2023.



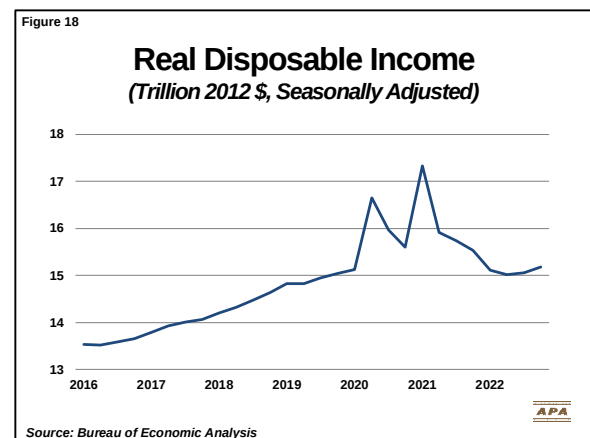
The Republicans want to take measures to slow the growth in spending, but the question becomes where and how much to make meaningful reductions without tax increases? CBO projects federal government outlays for 2023 will be \$6.2 trillion. Roughly 85% of the budget is given between entitlements, interest, and defense. (See Figure 17.) Any cuts in the growth rate of nondefense spending are not likely to be small because it will take time to enact, and it is politically challenging to cut pet programs. Inevitably the House will have to approve an increase in the debt ceiling, but how much will the increase be? Both parties will not be wanting to repeat this dance in the election year of 2024.



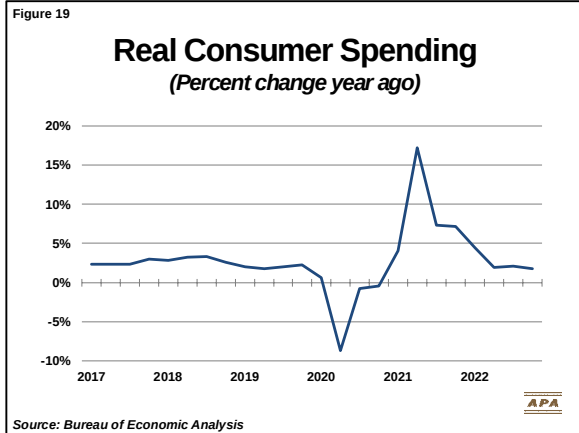
Where will the growth come from in 2023 and 2024?

Given the outlook for housing starts and home sales for 2023, residential construction will subtract from real GDP again in 2023. Nonresidential construction could add a little to real GDP, but not enough to come close to offsetting the decline in residential construction.

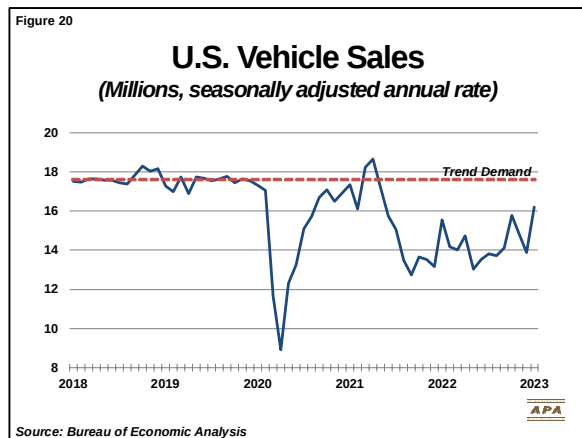
Consumer spending started off 2023 with a healthy gain based on the January retail and food service sales report. The concern going forward is the rate of growth in real disposable income, income after all taxes paid and adjusted for inflation. As shown in Figure 18, the level of real disposable income in the fourth quarter of 2022 was effectively the same as in the first quarter of 2020. The large spikes reflect the emergency measures taken by the federal government to support household incomes through the dislocations caused by the coronavirus. Those income support programs have played out and inflation exceeded compensation growth during 2022.



Consumer spending growth from the second quarter of 2022 through the fourth quarter of 2022 averaged about 2%, as shown in Figure 19. With real disposable income flat through this period, the growth in spending was met by consumers spending out of the savings created by the federal government income support programs. This is reflected in the saving rate falling to 3% in the second half of 2022.

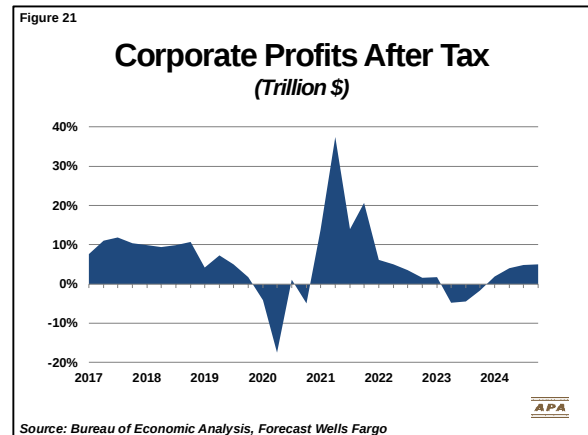


Constraints on production and higher borrowing rates on auto loans are expected to keep sales from returning to the trend rate shown in Figure 20. Anecdotal reports are that subprime auto loans have evaporated.

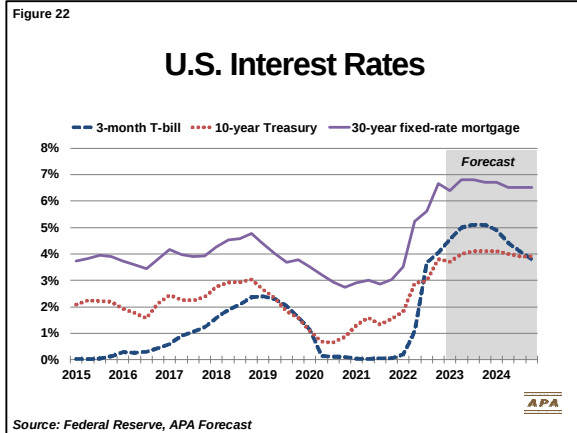


As inflation offsets wage gains, real disposable income growth will be constrained. In addition, if employment growth slows as expected by mid-2023, this will also be a factor in constraining income growth. The lack of income growth will in turn hit consumer spending, especially on discretionary items. That has already happened with recreational vehicles.

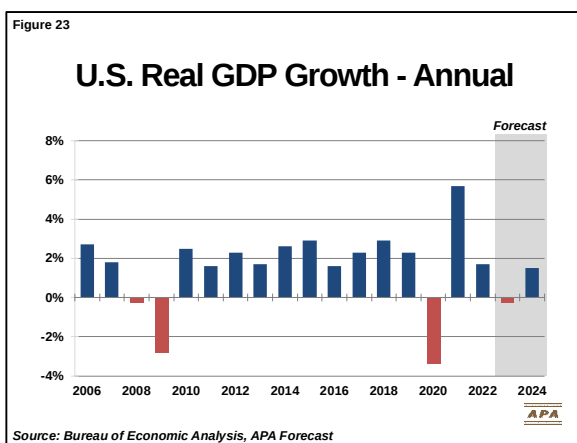
The prevailing view is business profit margins will be under pressure with a slowdown in sales. This will lead to a drop in corporate profits after taxes, as shown in Figure 21. Businesses are reported to be flush in cash, but the hit on profits after tax is expected to lead to reduced spending on business equipment.



On the interest rate front, the tightening of monetary has created a situation where the yield curve is inverted. As shown in Figure 22, the rate on 3-month T-bills has exceeded the yield on 10-year Treasuries since mid-2022. Historically, an inversion of the yield curve through tightening of monetary policy has preceded a recession by 6–12 months. The inverted yield curve is one factor leading some economists to forecast a recession beginning mid-2023, especially with the degree of the inversion increasing through the first half of 2023.

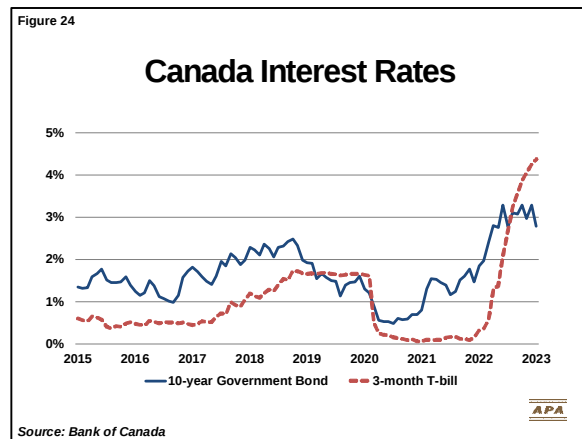


The bottom line here is that real GDP growth is expected to be near zero in 2023 and 1.5% in 2024. (See Figure 23.)



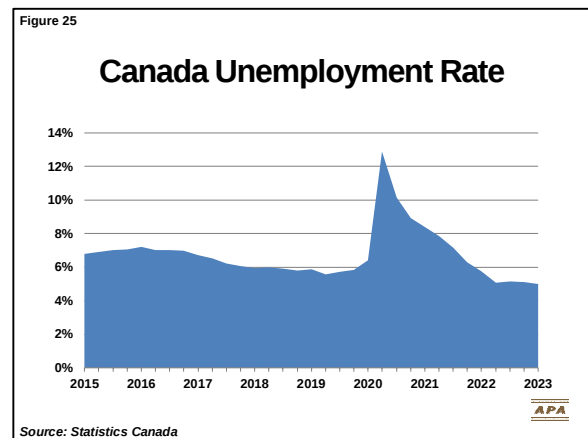
Canada

Canada's economy is experiencing similar trends as in the U.S. As shown earlier in Figure 1, inflation in Canada surged to 8% on a year ago month basis, the highest level in 40 years. Following the path of other central bank leadership, policymakers at the Bank of Canada aggressively began to tighten monetary policy in the first quarter of 2022. As shown in Figure 24, the yield on a 3-month T-bill in Canada has risen from near zero to start 2022 to 4.5% in January 2023. This is effectively equal to the increase in the rate on a 3-month T-bill in the U.S. A key point to capture from Figure 24 is that like the U.S., the yield curve in Canada is also inverted, which in the past has been a leading indicator of a recession.



Historically tight labor market

Another similarity with the U.S. economy is that the unemployment rate in Canada is at an historic low of 5.0%. (See Figure 25.) A major difference though is with Canada's more open immigration policy, growth in the working aging population increased 1.7% from January 2022 to January 2023. The working age population in the U.S. increased 1.0% over the same period. The labor force participation rate in Canada over those 12 months increased by a greater amount than in the U.S., so Canada's labor force expanded by 2.2% compared to 1.3% in the U.S.

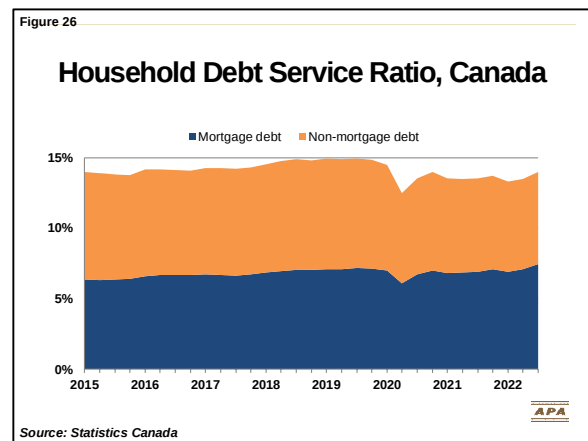


Canada has set even more ambitious immigration rates through 2025. The goal for 2023 calls for immigration of 465,000 and ramps up to 500,000 in 2025. Canada's population is estimated to be about 39.5 million. Immigration to Canada alone will lead to 1.2% growth in the population. Most of the immigrants to Canada are in the prime working age group, 25–54-year-olds. This will play a big role in helping to offset the effects of an aging domestic workforce. The high level of immigration to Canada is also supporting higher household growth that will lead to increased demand for new housing units in the coming years.

Rising mortgage payments eat into household income

Not only did the extraordinarily low interest rates of the last few years support an increase in the ability for prospective buyers to aggressively compete for homes, but existing owners also got some relief from a drop in their mortgage payments. This trend is set to reverse in the next few years, as interest rates are not going to return to the levels of the last five to six years. The overwhelming majority of home mortgages in Canada are variable rate loans, meaning existing owners will face higher mortgage payments as the rate on the mortgage adjusts upwards.

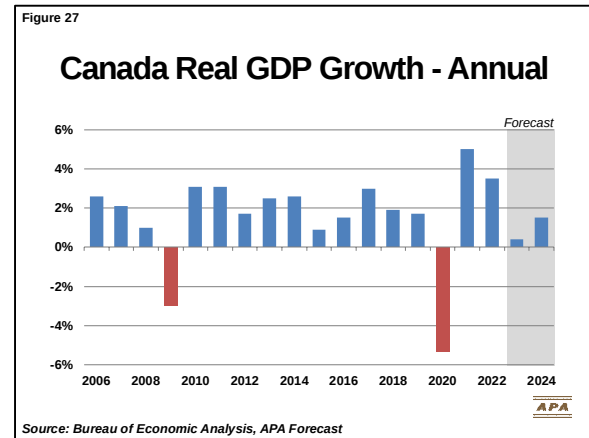
As shown in Figure 26, the household debt service ratio declined from 15% in mid-2019 to 13.5% in 2020 and started to creep up in 2022 with the rise in interest rates. The debt service ratio is going to be on an upward trend through at least 2024. As Canadian homeowners face diverting a greater share of their disposable income to debt service, this will eat into spending on other goods and services.



Recession is consensus view

The tightening of monetary policy in Canada is expected to have the same effect as in the U.S. The prevailing view of Canadian bank economists is that the economy will experience a mild recession in the middle part of 2023 and the degree of recovery will be muted. The boom in consumer spending on services that took place in mid-2022 has played itself out. The restoration of supply chains also helped manufacturers, wholesalers and retailers add to inventories during 2022, but that source of growth will be less in 2023. Even if housing starts in 2023 and 2024 were to remain at the 2022 rate, that has a neutral effect on the GDP calculation. These forces point to real GDP growth on an annual

basis to run in the 0–0.5% range in 2023 and then run in the 1–1.5% range in 2024. (See Figure 27.)



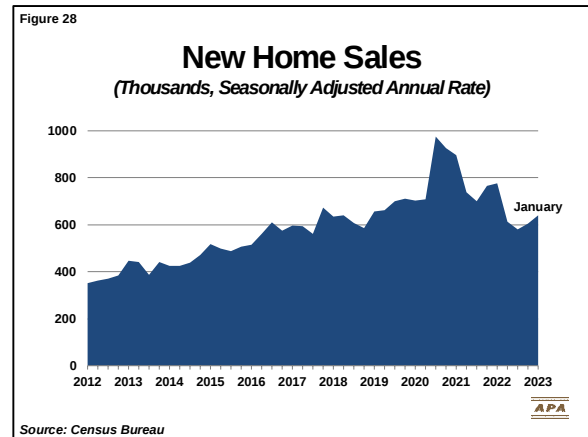
MARKET SEGMENTS

U.S. New Residential Construction

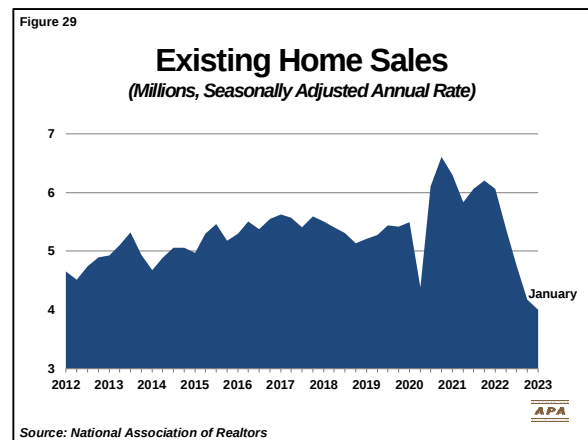
After falling from just over 7% in November 2022 to near 6% in January 2023, the rate on a 30-year fixed-rate mortgage has been on the rise and is back to near 7%. We should expect considerable volatility in mortgage rates over the next 12–18 months, which adds uncertainty for when potential buyers will feel comfortable enough to make the purchase decision. This uncertainty will also challenge home builders regarding when to start spec homes and what potential homebuyers will be able to afford.

Entering 2023 with little momentum

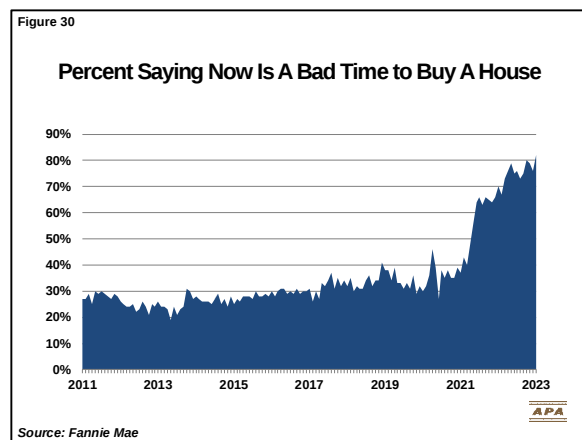
Home sales were mixed to finish 2022 and household sentiment regarding buying a home was negative. New home sales bounced up a little in the fourth quarter of 2022 and that continued into January. The increase in sales was supported by the decline in mortgage rates through January and home builders offering incentives to drive sales. (See Figure 28.) One thing to note though is that the Census Bureau estimate does not account for cancellations, which were on the rise in the second half of 2022. This means net sales did not increase as fast as implied by the Census Bureau data.



Existing home sales averaged a seasonally adjusted annual rate of 4.18 million units in the fourth quarter of 2022 and fell to an annual rate of 4.0 million units in January. This marked the lowest sales rate since October 2010. (See Figure 29.)

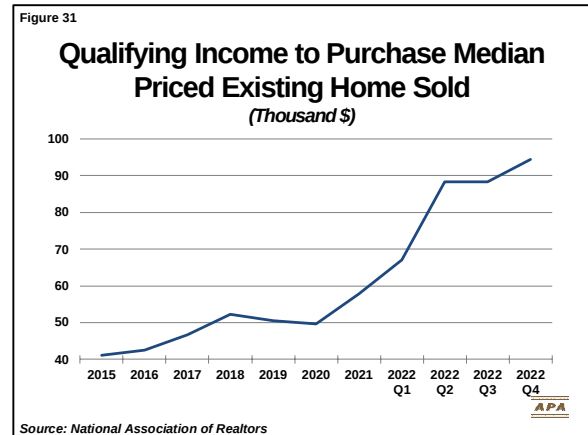


As shown in Figure 30, Fannie Mae’s survey of consumer attitudes in January 2023 hit a record high in terms of the percentage saying the current month was a bad time to buy a home. Fannie Mae did not begin this survey until 2012, so it does not capture attitudes towards buying a home after the bursting of the housing bubble that contributed to the Great Financial Crisis of 2007–09. The expectation of mortgage rates remaining in the 6–7% range through 2023 will likely sustain the negative feeling towards buying a home through the rest of the year.



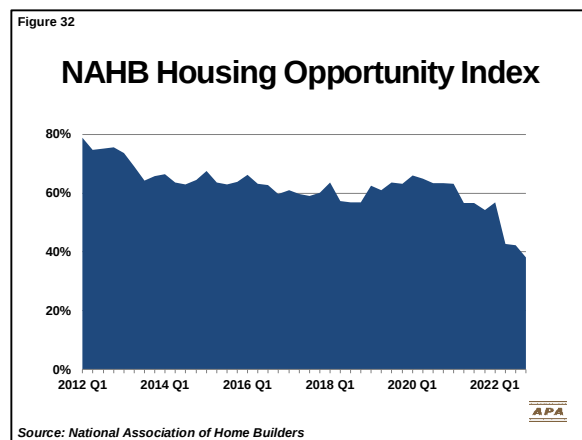
Shrinking the pool of potential buyers

Sales of existing homes accounted for 89% of all U.S. home sales in 2022, so data pertaining to this segment of the housing market will be used to depict the deterioration in the ability to buy a home in 2022. Shown in Figure 31 is the qualifying income for a mortgage to purchase the median priced home sold from 2015 through the fourth quarter of 2022. The values for 2015 through 2021 are the annual averages and for 2022 are the quarterly averages. These values are based on a 20% down payment and 25% of income devoted to the mortgage payment.



The qualifying income for a mortgage to support the purchase of the median priced home sold from 2018 to 2020 was near \$50,000. The decline in mortgage rates during those years offset the impact of higher prices. In those years, the median family income averaged 60% greater than what was needed to qualify for a mortgage. The rapid increase in home prices and the rise in the rate on a 30-year fixed-rate mortgage to start 2022 and hitting 7% in November 2022 drove the qualifying income to \$95,000 in the fourth quarter of 2022. Over a two-year span, the qualifying income nearly doubled, drastically reducing the pool of potential home buyers.

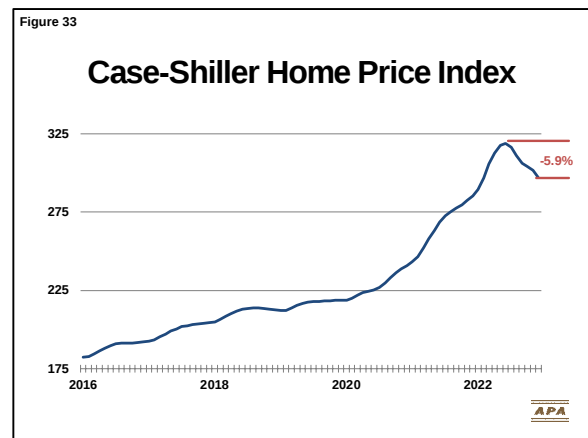
Another way to depict the deterioration in affordability is to use the NAHB Opportunity Index. The research staff at NAHB has access to a database that has prices of new and existing homes sold in a quarter. The index is created by estimating the percentage of homes that a family earning the median family income in the quarter could purchase with a mortgage where the down payment is 10% of the sales price and 28% of income meets the mortgage payment plus taxes and insurance. As shown in Figure 32, the Opportunity Index averaged at least 60% from 2012 through the first quarter of 2022. That percentage plunged to 38% in the fourth quarter of 2022.



It should be no surprise then that the sentiment towards buying a home has deteriorated rapidly as shown earlier in Figure 30. Between the shrinking of the pool of potential home buyers and negative sentiment towards buying a home, expect home sales to tread water, at best, through 2023 and into the first half of 2024.

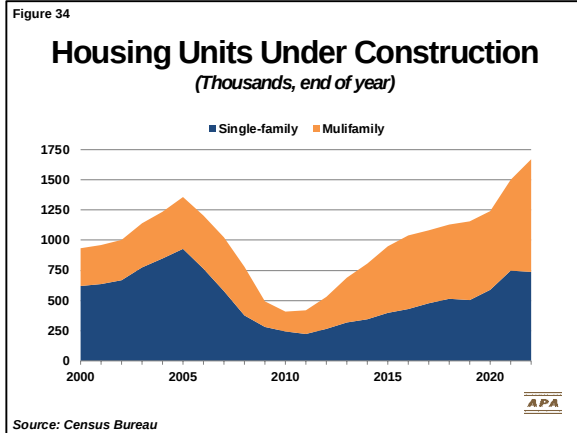
Home prices peaked in June 2022

One of the key messages in the 2022 Fall Outlook was that home prices were likely to fall through 2023 and the early part of 2024. Based on the Case-Shiller Home Price Index, the median-price of homes had fallen 5.9% from June 2022 to December 2022. (See Figure 33.) There is a wide range of forecasts for the path of home prices through 2024. One Federal Reserve staff paper concluded that the average decline over the next two years could be near 20%.



Record number of housing units under construction

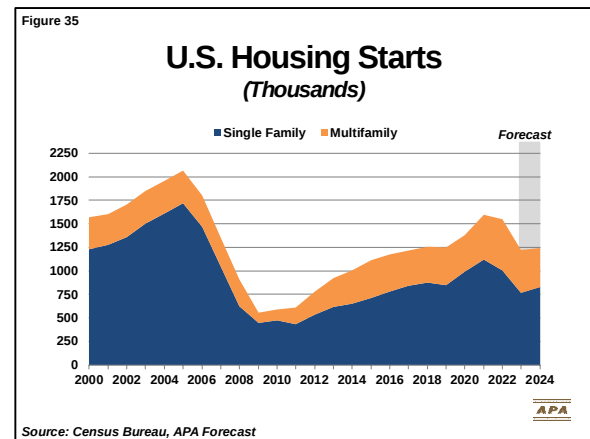
At the end of 2022, there were almost 1.7 million housing units under construction, a record high. (See Figure 34.) The split was 735,000 single-family homes and 935,000 multifamily units. Home builders and apartment developers are challenged to get these units finished in a timely manner due to the inability to secure building materials and a consistent supply of labor. One housing industry focused market research firm estimates 500,000 new apartments will be completed in 2023. In turn, lenders continue to tighten their lending standards for multifamily construction loans.



No meaningful change in 2023 and 2024 forecast

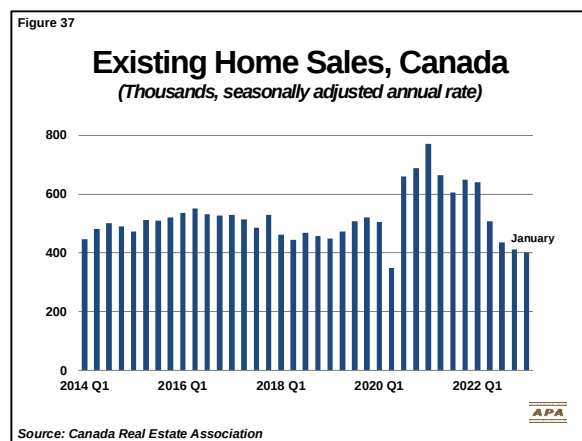
Housing starts totaled 1.55 million units in 2022, with single-family slightly greater than one million units and multifamily starts totaling 550,000 units. Based on the forces just laid out, there is little change to the outlook for single-family starts from the 2022 Fall Outlook. Single-

family are forecast to total 785,000 in 2023 and increase to 825,000 units in 2024. The forecast for multifamily starts has been revised down by 10% to an average of 470,000 units in 2023 and 2024. (See Figure 35.)

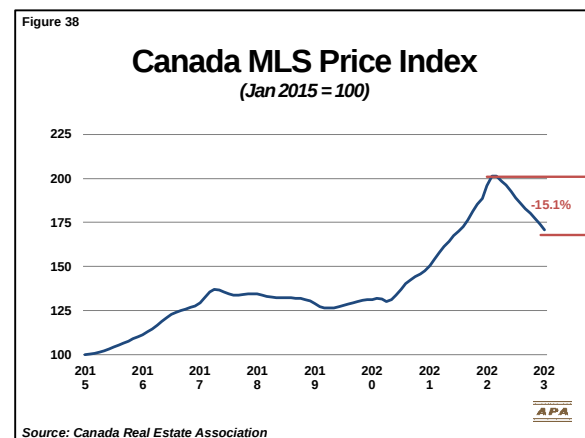


Canada, New Residential Construction

Like the situation with the Canadian economy, the housing market in Canada is experiencing the same trends as in the U.S. Existing home sales averaged a seasonally adjusted annual rate of 640,000 in the first quarter of 2022 and fell to an average rate of 408,000 in the fourth quarter. Sales in January ran at a seasonally adjusted annual rate of 400,000. (See Figure 37.)



Home prices peaked in mid-2022. However, the degree of the price decline in Canada has been much greater than that of the U.S. based on the Canada Real Estate Association's MLS Price Index. (See Figure 38.)

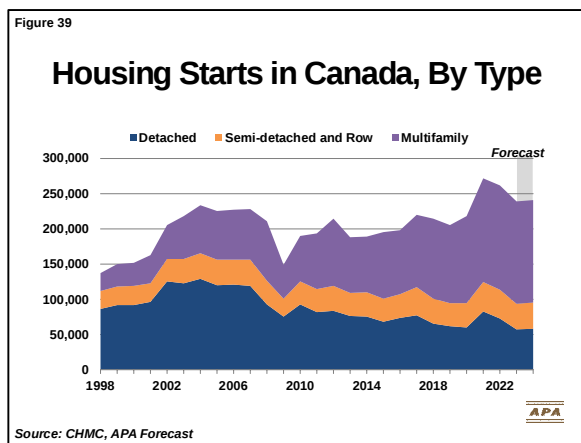


Immigration will add to new housing demand

As stated earlier, government policy makers have set annual goals for immigration to Canada to offset the effects of an aging population. In 2022 the plan was for immigration to total 450,000. The recently announced plan calls for immigration to step up to 500,000 in 2025. The average number of people per household in Canada is 2.7. Assuming that is true for people immigrating to Canada, immigration added roughly 165,000 households in 2022. The 2025 goal of 500,000 will add 185,000 households. The natural increase in Canada's population based on births minus deaths is expected to result in household growth from this source of 30,000 to 40,000 per year. Adding the two together yields household growth of 195,000 to 225,000 by 2025. Accounting for replacement demand and second homes, demand for new housing by 2025 should be in the 245,000 to 275,000 range.

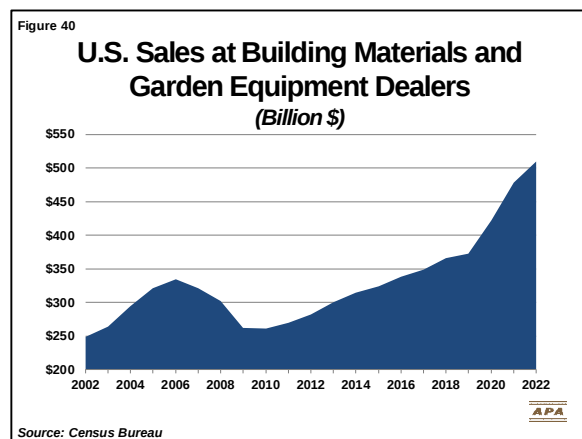
Little change in forecast

Housing starts totaled 262,000 in 2022 with Ontario and Quebec accounting for 37% and 22% of the starts, respectively. As shown in Figure 39, single-family detached starts fell from 82,600 in 2021 to 72,600 in 2022. Single-family detached starts share of total starts was 28%. Starts of single-family attached and row houses in 2022 totaled 41,100, down about 2% from 2021. Multifamily starts in 2022 totaled 148,300, up marginally from 2021. The forecast calls for housing starts to run near 250,000 units in 2023 and 2024, with single-family detached accounting for 23% of the starts.

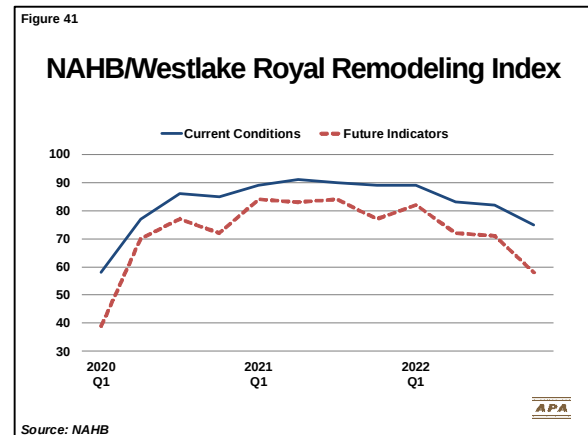


Repair and Remodeling, U.S.

Sales at building materials and garden equipment dealers totaled \$510 billion in 2022, an increase of 6.6% from 2021. (See Figure 40.) The growth in sales was half of what occurred in 2021 when sales rose 13.3%. The values shown are in nominal dollars, as there is not the detailed data to help us understand where the growth took place in volume terms. During 2022, the monthly sales figures were relatively flat at \$42 billion per month. The stagnant market from January to December of 2022 is consistent with the report from a major Big Box retailer in this part of the retail space.



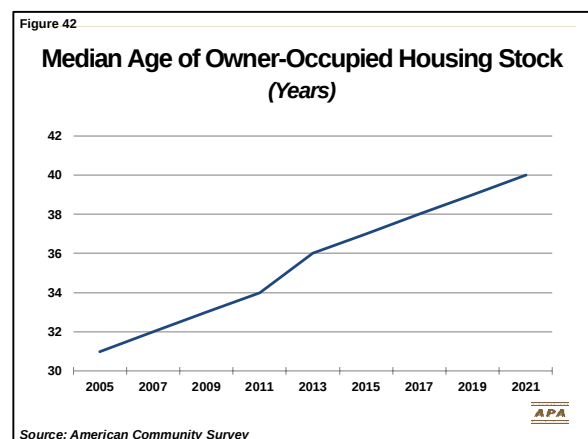
In association with Westlake Royal, NAHB conducts a quarterly survey of remodelers with questions regarding current and future conditions. The values are expressed as an index. A reading above 50 signals good conditions and less than 50, poor conditions. It should be no surprise that with interest rates moving higher and fewer home sales taking place, operating conditions softened through the course of 2022. (See Figure 41.) At year-end, the index value for future indicators was near 50, pointing to concerns about the strength of the repair and remodeling market for 2023.



The forecast calls for repair and remodeling to fall by 5% in 2023 and then grow by 2% in 2024.

Does aging housing stock create opportunities?

Based on data compiled by the Census Bureau in its annual American Community Survey, the median age of the owner-occupied housing stock has risen from 31 years in 2005 to 40 years in 2021. (See Figure 42.) Some housing analysts have said this means there will be attractive growth opportunities for residential repairs and remodeling.

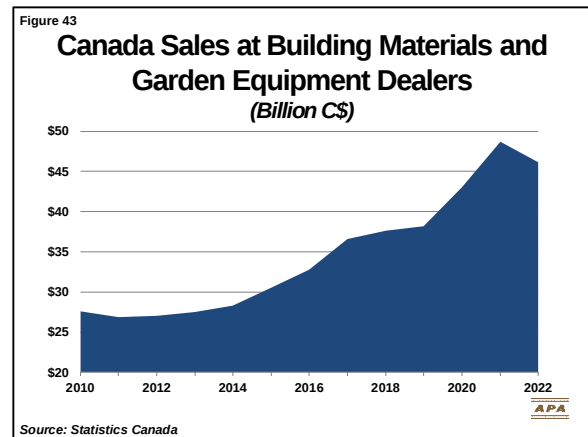


However, that may not necessarily be the case. Homes that are said to be old just based on age remain economically viable because there have been repairs and upgrades over time. Another consideration is that the quality of the building materials has improved so they last longer. This is evidenced by the biannual HUD survey results asking homeowners about their repair and remodeling projects. For example, the number of roofing or siding projects has been fairly constant for the last 15 years, despite growth in

the owner-occupied stock. Another consideration is that the average size of homes built has increased, so there is less of a need to add a room or rooms to the existing structure. The bottom line here is that age alone is not necessarily the sole measure to use when thinking about the growth potential in the repair and remodeling market. Economic factors such as financing costs, household income and regional population growth trends enter the equation.

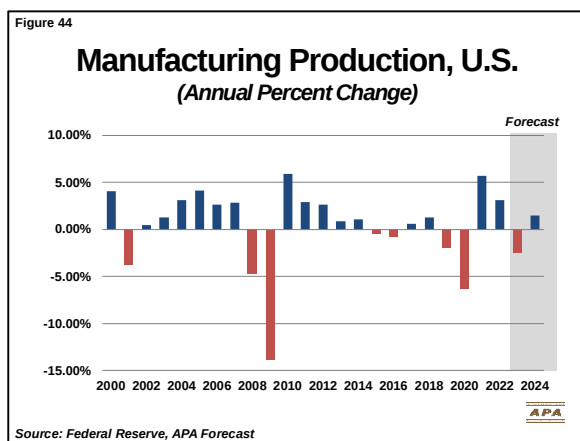
Repair and Remodeling, Canada

As said in past outlooks, perhaps the best available indicator of the trend in repair and remodeling in Canada is the sales estimate for building materials and garden equipment dealers. As shown in Figure 43, the nominal dollar sales value in these stores fell from C\$48.7 billion in 2021 to C\$46.1 billion in 2022, a decrease of 5%. Sales are likely to be down again in 2023, as homeowners reconsider the return on investment when home prices are falling, and their discretionary income is being squeezed by inflation and potentially higher mortgage payments as the rate on their mortgage adjusts upwards.



Industrial U.S.

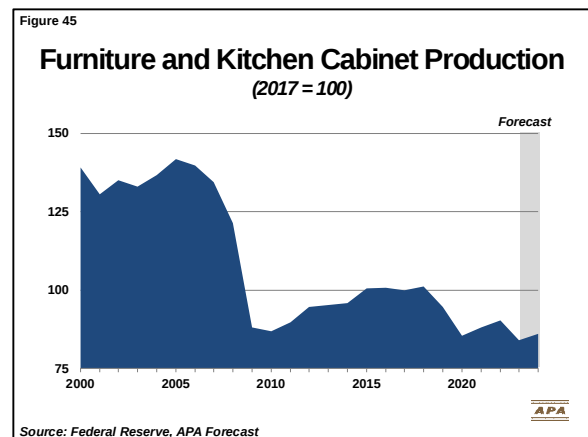
After averaging growth at an annual rate of 3.3% in the first half of 2022, manufacturing production declined at an annual rate of 1.5% in the second half of the year. Despite the weakness in the second half of 2022, manufacturing production for the year was up 3.1% from 2021, as shown in Figure 44. The growth in 2022 was led by the transportation sector. Production of motor vehicles and parts rose 8.3%. Auto and lightweight truck production, which includes SUVs, totaled 9.75 million in 2022, up from 8.87 million in 2021. The 2022 total was still down 7.6% from the 2019 production level of 10.55 million. Aerospace and miscellaneous transportation equipment rose 6.2%, coming in second behind motor vehicles and parts.



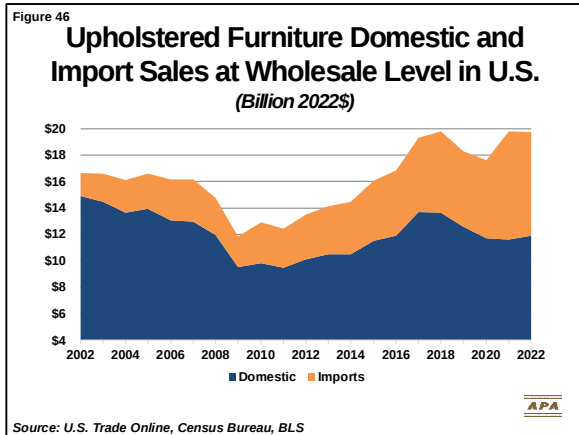
Given that manufacturing production in January 2023 was 0.5% below that of the fourth quarter of 2022 and an expected recession, manufacturing output is forecast to fall 2–3% this year and then partially recover by 1–2% in 2024.

Furniture and cabinet production down sharply

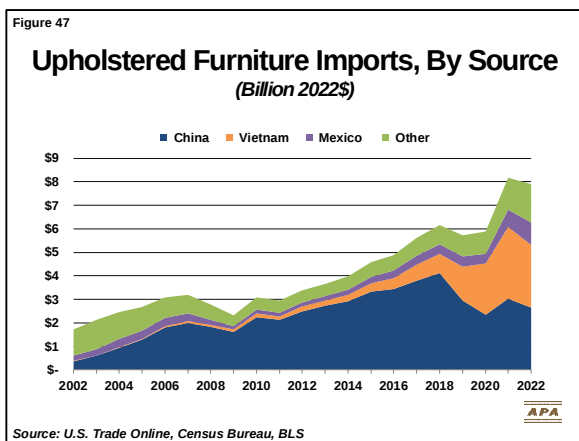
The furniture and cabinet industry started 2022 on a high note. First quarter production rose at a seasonally adjusted annual rate of 13% and was up 7% from the first quarter of 2021. Beginning in the second quarter, production started its decline, in line with the drop in home sales and homebuilding. The decline continued in January of this year as production was down 5.8% from January 2022. Depressed home sales and further declines in housing starts point to reduced demand for furniture and cabinets through 2023. For the year, production is projected to be down 7% in 2023 and increase 2.5% in 2024. (See Figure 45.)



Based on estimated domestic production and imports, upholstered furniture sales in 2022 were flat in 2022 compared to 2021. (See Figure 46.)

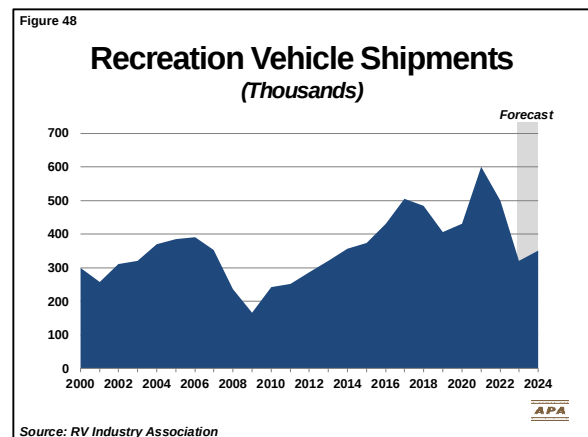


Imports fell 3.7% from 2021. As shown in Figure 47, U.S. imports of upholstered from China and Vietnam were both down 13% from 2021. Imports from Mexico rose 28% to \$950 million and imports from other sources totaled \$1.63 billion, up 19% from 2021.



RV industry in severe recession

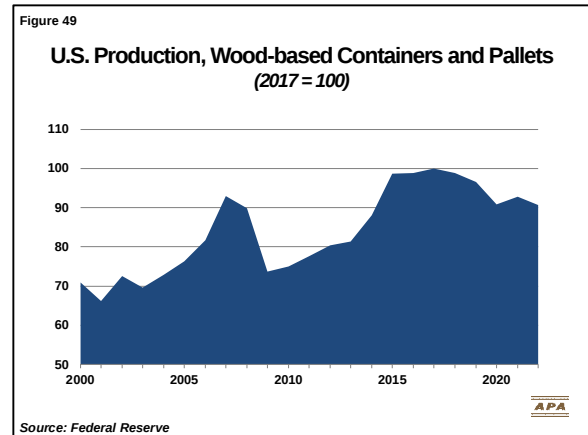
Like the furniture industry, the recreational vehicle (RV) industry started 2022 on a high note. Shipments in the first quarter totaled 171,466, up 15.5% from the first quarter of 2021. The combination of the surge in gas prices and higher financing costs led to a sharp decline in RV shipments through the year. December 2022 shipments were down 51% from December 2021. For the year, shipments totaled 492,427, down 18% from 2021. The forces that led to the drop in output over 2022 continue to hold. January 2023 shipments totaled 20,405, down 62% from January 2022. The forecast calls for shipments to run in the 300,000 to 350,000 range in 2023 and 2024. (See Figure 48.)



Wood-based container and pallet output down

The wood-based container and pallet index value averaged 91.5 the last three years, down 7% from the average of 2017 to 2019, as shown in Figure 49. The drop in 2020 makes sense due to the coronavirus driven recession. However, the demand for wood-based containers should have increased with the rise in manufacturing and retail sales in 2021 and 2022. One factor that could have led to the weakness in demand for wood-based containers and pallets relative to the increase in materials handling was the surge in wood products prices. Currently, wood products are lower than the last two years, which should restore the competitiveness of wood-

based containers and pallets in 2023. However, with manufacturing output expected to be down in 2023, that will limit any increase in demand for wood-based containers and pallets.



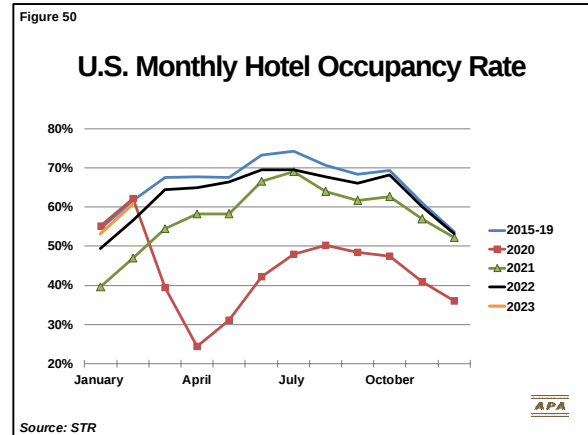
Nonresidential Construction, U.S.

Several segments of the nonresidential construction market hit their low for this cycle in mid-2022 and entered 2023 with great momentum, albeit from historically depressed levels. The segments include lodging and commercial construction, which is comprised of auto related stores, restaurants, retail, and other stores, such as drug stores. Some of the increase in retail is driven by refurbishing of retail space for new tenants occupying space left vacant by closures. The upward drift in interest rates, the likelihood of a recession beginning in mid-2023 and tightening of lending standards will present challenges for nonresidential building through 2024.

The values expressed in the put-in-place data shown in the charts are expressed in 2022 dollars based on the deflators used to calculate real GDP by the research staff at the Bureau of Economic Analysis.

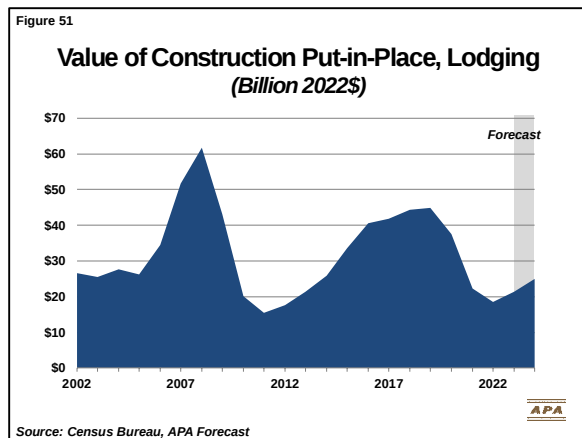
Hotel occupancy rate near 2015–19 levels

As shown in Figure 50, the monthly occupancy rates over 2022 were near that of the 2015–19 monthly averages. For the first two months of 2023, the monthly occupancy rates have tracked that for the same period in 2015–19. The combination of higher occupancy rates and daily room rates have pushed industry revenues to a record high in nominal dollars but are still below 2019 levels adjusted for inflation. Room demand is expected to get a boost from pent-up international travel to the U.S., which should keep occupancy rates tracking with the historical averages despite a recession in the U.S.



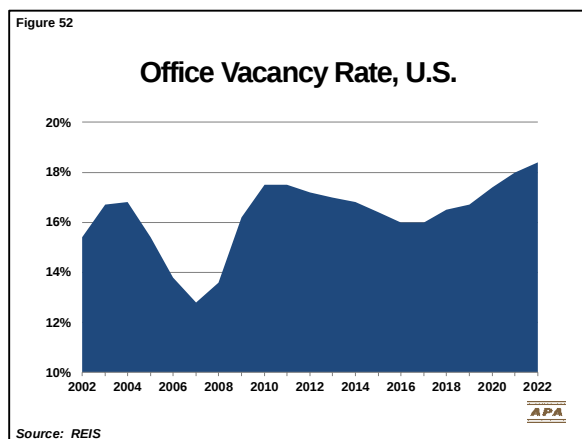
The improved business environment for the industry is visible in the decline in the delinquency rate on commercial mortgage-backed securities. It was 6% in January 2023, well below the 20% rate at the height of the coronavirus in 2020–2021. At 6% though, it is still high compared to the 2% rate of 2015 to 2019. To improve profit margins to offset wage growth exceeding that of other industries, hotel operators are using technology, like automated check-in to save on labor costs.

At the end of December 2022, there were 160,000 hotel rooms under construction in the U.S., down from the pre-pandemic high of 212,000. This is not as severe of a decline as implied by the value put-in-place estimates adjusted for inflation in building costs shown in Figure 51. The value put-in-place estimates are based on the monthly value add to the structure, which can help explain a portion of the implied discrepancy with the room count measure. One other factor relating to the data shown in Figure 51 is that conversion of other commercial buildings to hotel space will be accounted for in the lodging value put-place estimates. The forecast calls for growth of 10–15% in 2023 and 2024, respectively.



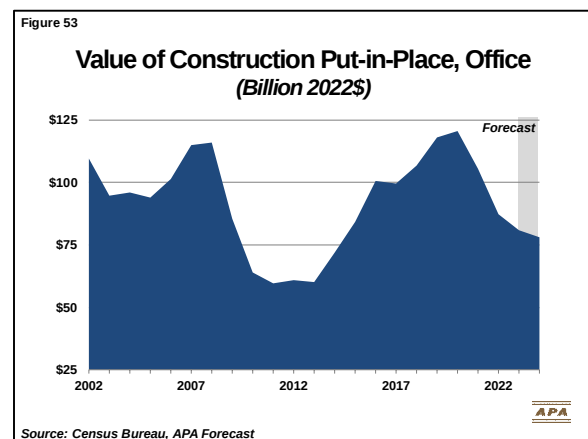
Office construction trends lower

The office vacancy rate averaged 18.4% in 2022, a record high. (See Figure 52.) As stated before, this understates the effective vacancy rate. Based on data from a market research firm tracking office occupancy rates on a weekly basis, the last estimate shows the occupancy rate at just 50%, as the national average. There is reported to be considerable sublease space coming on the market and with layoffs occurring in tech and finance, the office vacancy rate will increase again in 2023.



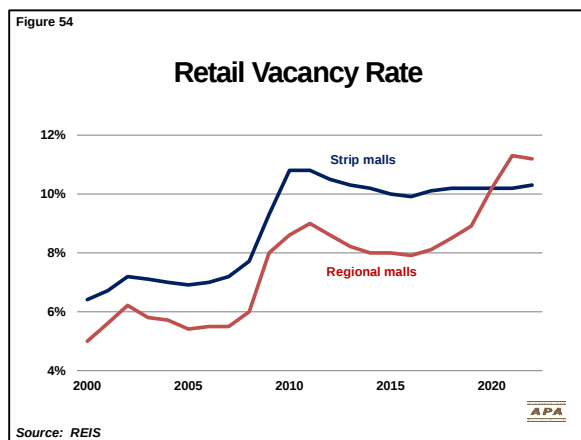
Office asking rents on a national basis are reported to have risen 0.1% in the fourth quarter and were up 1.1% from the fourth quarter of 2021. However, these are reported asking rents, so this measure is not capturing the negotiated concessions. The parts of the country experiencing the fastest asking rent growth tend to be in the South. Dallas, Charlotte, Phoenix, and Tampa are the four leaders.

Following the increase in interest rates, the cap rate on office properties stood at 6.9% in the fourth quarter. This is the highest cap rate for offices since 2015. The key factors that drive office construction are negative, so the inflation adjusted value of office construction is projected to fall 7% in 2023 following a decline of 17% in 2022. (See Figure 53.) The projected decline for 2024 is smaller at 4%.

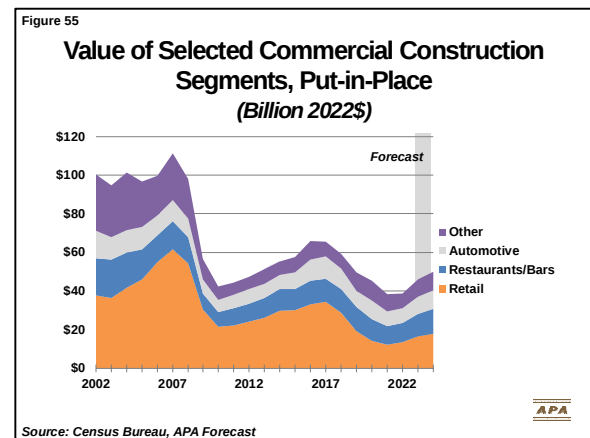


Retail construction recovering from historic low

The vacancy rate in the retail space remains historically high. (See Figure 54.) This is not surprising because there were many announcements by leaders of well-known store brands that announced store closings throughout 2022. Despite the high vacancy rate, asking rent in the retail sector was up 4.1% in the fourth quarter compared to the fourth quarter of 2021. One must go back to 2003–05 to see the retail asking rent in the 4% range or higher. One thing helping retail stores is that e-commerce sales share of retail sales since early 2021 has stabilized at 16%.



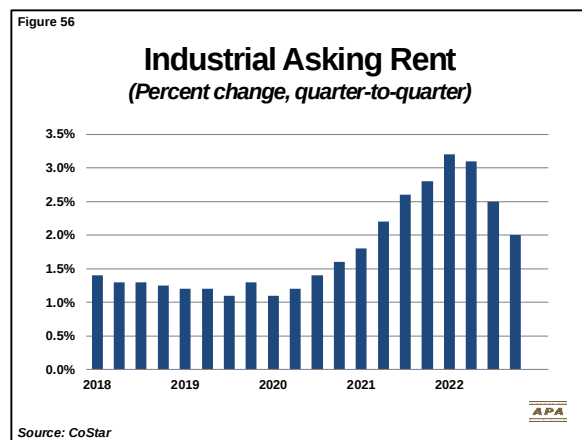
Investment in retail buildings strengthened over the course of 2022, so when adjusted for inflation for the year in total, investment was effectively unchanged 2021. (See Figure 55.) As pointed out in past discussions, the data shown in Figure 55 include construction of new buildings and refurbishment of existing retail space. This is quite visible in some large shopping malls as stores have been retooled into medical offices, restaurants, and exercise facilities. The momentum at the end of 2022 is expected to carry through into 2023, albeit from an historically low level of investment.



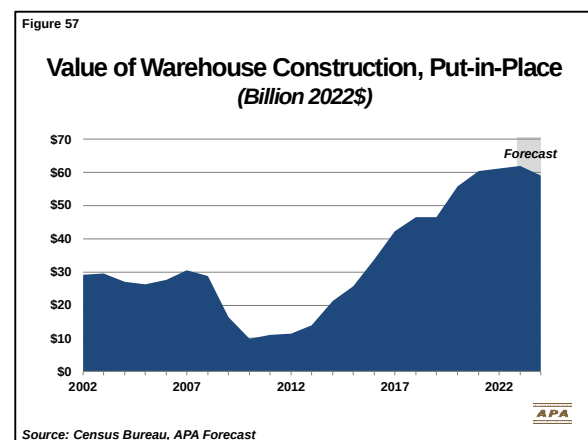
Fundamentals still favorable for warehouse construction

In general, the fundamentals for the warehouse and logistics industry were favorable at the end of 2022 compared to other sectors of the nonresidential construction. Net absorption in the fourth quarter of 2022 was 109.6 million square feet, up 53.1% from the fourth quarter of 2021. Net completions in the fourth quarter were a record high of 120.8 million square feet. The increase in supply compared to absorptions led to a slight rise in the vacancy rate to 4% in the fourth quarter from 3.9% in the second and third quarters of 2022.

As shown in Figure 56, the rate of increase in the asking rent for industrial has slowed from a little over 3% in the first half of 2022, or greater than 12% annualized rate, to 2% in the fourth quarter. Industrial property valuations in December 2022 were up 12.2% compared to December 2021. This compares extremely well to the 0.9% increase for the all-property index.



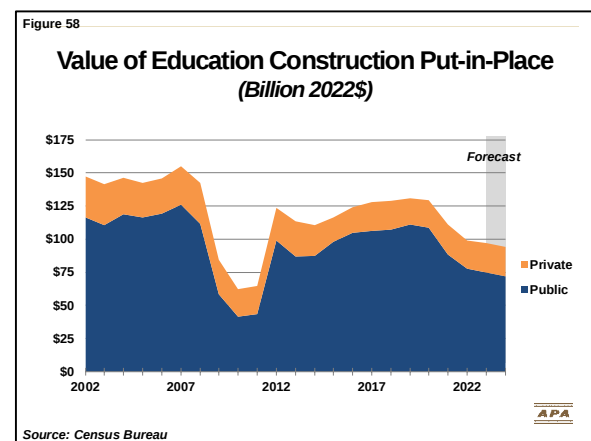
The forecast calls for investment in warehouse space to be at a peak and edge lower in the next two years. (See Figure 57.) In the fourth quarter of 2022, there was 600 million square feet of industrial space under construction, equal to 3.8% of the existing inventory. After 12 years of a steady downward trend in the vacancy rate driven by the surge in e-commerce in the retail space, the vacancy rate should move up over the course of the next two years. This should lead to a bigger decline in warehouse construction after 2024.



Public school enrollment down

Tabulation of data from the nation's K-12 school districts is providing us with better insights as to how school closures due to COVID affected public school enrollment. In school districts that were mostly remote, public-school enrollment fell 4.4% from the Spring of 2020 to the Spring of 2022. During the same time in districts that returned quickly to in-person classes, the decline was 1.2%. For the average of remote and in-person, the decline was 2.3%. The states seeing the biggest enrollment decline from 2020 to 2022 were New York, down 5.9%; Oregon, down 5.7%; Mississippi, down 5.5%. Utah, South and North Dakota all registered an increase of 2% in enrollment from 2020 to 2022. In total, 1.27 million students left public schools from 2020 to 2022.

Since public schools lose funding when enrollments decline, it should come as no surprise that investment in public education facilities fell in 2022, while investment in private schools rose. (See Figure 58.) The rate of decline in investment in public schools should slow as students are expected to return to the classroom. The forecast shown is not meaningfully different than from the Fall 2022 Outlook.



North America Structural Panel Import and Exports

The historical and projected structural import and export volumes are provided in Tables 4 through 7.

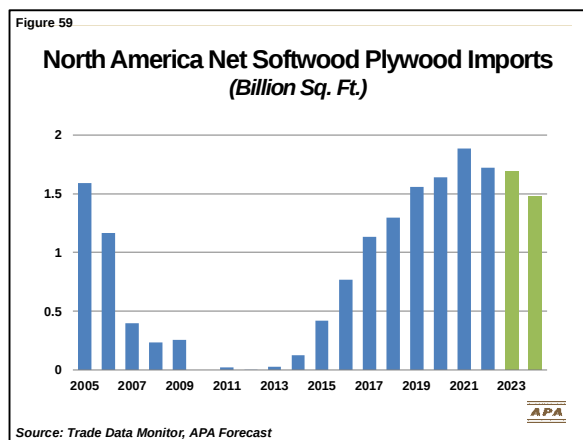
U.S. imports of softwood plywood from non-Canadian sources totaled 1.95 billion square feet in 2022, down from 2.09 billion square feet in 2021. The decline can be explained by fewer imports coming from Brazil. Plywood imports from Brazil fell from 1.15 billion square feet in 2022 to 1.01 billion square feet in 2023. On a half year basis, imports from Brazil totaled 584 million square feet in the first half of 2022 and fell to 423 million square feet in the second half. Imports from Chile increased from 481 billion square feet in 2021 to 522 billion square feet in 2022. Reported imports from China fell from 327 million square feet in 2021 to 298 million square feet in 2022.

Led by an increase in shipments to Mexico, U.S. softwood plywood exports to non-Canadian destinations totaled 294 million square feet in 2022, up from 268 million square feet in 2021.

U.S. softwood plywood imports are forecast to be down in 2023 and 2024 compared to 2022 due to weaker demand for plywood in general. Exports will be up slightly. This means net softwood plywood imports in the U.S., excluding trade with Canada, are projected to fall from 1.98 billion square feet in 2022 to 1.78 billion square feet and 1.76 billion square feet in 2023 and 2024, respectively.

Canada's net imports of softwood plywood, excluding trade with the U.S., totaled 61 million square feet in 2022. That volume is not expected to change much over the next two years.

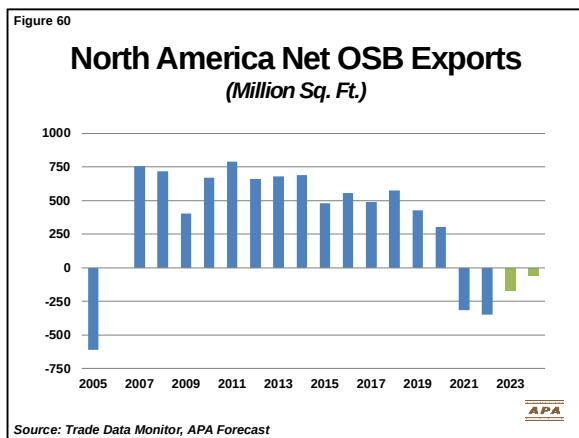
In total, North America was a net importer of softwood plywood of 1.72 billion square feet in 2022, down from 1.95 billion square feet in 2021. (See Figure 59.) Net softwood plywood imports are projected to fall to 1.52 billion square feet and 1.47 billion square feet in 2023 and 2024, respectively.



U.S. OSB imports from non-Canadian sources totaled 579 million square feet in 2022, down from 630 million square feet in 2021. Imports from Russian fell from 129 million square feet in 2021 to 65 million square feet in 2022 and are assumed to fall to zero in 2023 and 2024. Imports from Romania declined from 159 million square feet in 2021 to 78 million square feet in 2022. There were increases from other sources in 2022, with the largest import volume coming from Latvia at 329 million square feet. It is assumed imports from non-Canadian sources will decline in 2023 and 2024 due to weaker demand and increased competition from North American producers with the ramp up in capacity over these two years.

Canadian OSB exports to non-U.S. markets fell to 180 million square feet in 2022, down from 268 million square feet in 2021. The decline was in exports to non-Japan Asian markets. Exports to Japan and the other Asian markets are assumed to show little change from 2022 in 2023 and 2024.

The decline in OSB exports from Canada more than offset the decline in OSB imports in the U.S., so the net export position deteriorated slightly in 2022. The net trade position is projected to improve in 2023 and be close to zero in 2024. (See Figure 60)



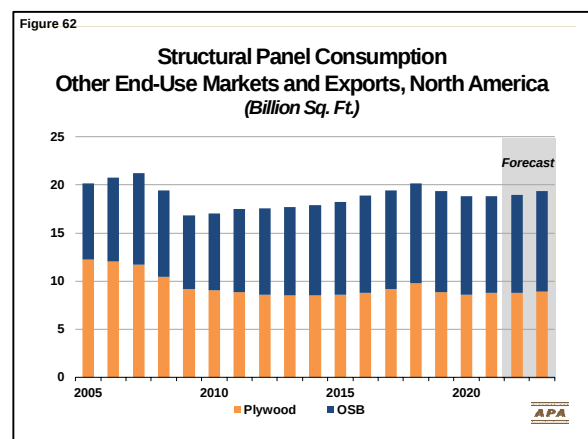
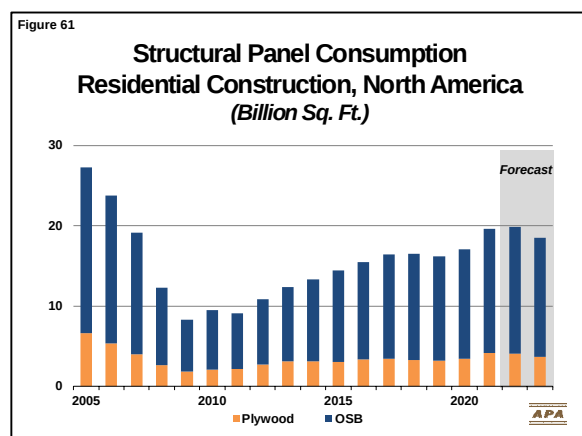
Structural Panel Demand and Production

Structural panel use in residential construction is estimated to have totaled 18.0 billion square feet in 2022, down 7.7% from 2021. The reduced use of structural panels was driven by the decline in single-family starts in the U.S. from 1.13 million units in 2021 to 1.01 million starts in 2022. Average size of new single-family homes started in 2022 was down 1.1% from 2021. The mix of fewer starts and drop in average home size subtracted 1.76 billion square feet from structural panel use in 2022. The increase in multifamily starts in the U.S. from 471,000 in 2021 to 540,000 units in 2022 added 400 million square feet to structural panel use in residential construction.

Structural panel use in residential construction will be down again in 2023, as higher mortgage rates drive a decline in housing starts in the U.S. and Canada. In the U.S., structural panel use in residential use is forecast to fall from 16.3 billion square feet in 2022 to 12.7 billion square feet in 2023. At 12.7 billion square feet, this puts structural panel use in residential construction back to where it was in 2015. Structural panel use in Canada is forecast to fall from 1.7 billion square feet in 2022 to 1.5 billion square feet in 2023. The modest increase in housing starts in 2024 is forecast to lift structural panel use in

residential construction in North America to 14.8 billion square feet, up 4.8% from 2023. (See Figure 61.)

The sum of structural panel uses in residential repair and remodeling, industrial applications, nonresidential plus exports is estimated to have totaled 18.5 billion square feet in 2022. Declines in repair and remodeling and industrial applications in 2023 will drop the sum of the four to 17.9 billion square feet in 2023. Modest growth across all four components in 2024 will add an estimated 400 million square feet to this sum in 2024. (See Figure 62.)



Structural panel production in 2022 totaled 33.3 billion square feet in 2022, down 700 million square feet, or 2.4%, from 2021. Weaker demand for structural panels in 2023 is projected to cause production to fall to 30.2 billion square feet in 2023. Production is projected to rise to 30.9 billion square feet in 2024, driven by modest improvements in homebuilding, repair and remodeling and industrial applications. (See Figure 63.)

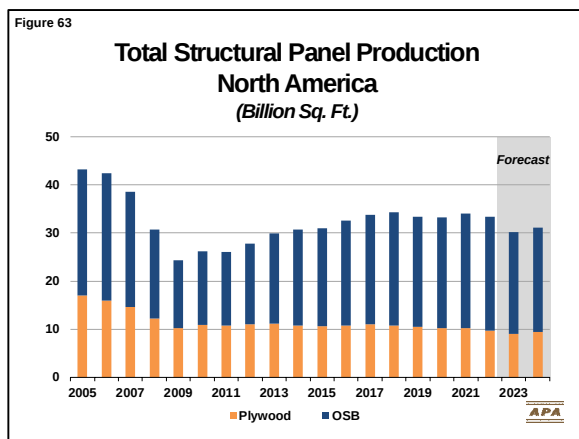


Table 1

U.S./CANADA STRUCTURAL PANEL DEMAND & PRODUCTION

Million Square Feet 3/8" Basis

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Residential Market										
Plywood	2,987	3,319	3,412	3,295	3,166	3,459	4,118	3,694	2,834	2,887
OSB	11,471	12,151	13,050	13,206	13,004	13,588	15,419	14,351	11,681	12,104
Total	14,458	15,471	16,461	16,501	16,170	17,047	19,537	18,044	14,516	14,991
% Change	9%	7%	6%	0%	-2%	5%	15%	-8%	-20%	3%
Remodeling Market										
Plywood	2,779	2,848	2,899	2,905	2,886	3,006	3,171	3,158	2,961	2,985
OSB	4,298	4,546	4,700	4,836	4,900	4,975	4,958	4,971	4,775	4,870
Total	7,076	7,394	7,599	7,741	7,786	7,981	8,129	8,129	7,736	7,854
% Change	5%	4%	3%	2%	1%	3%	2%	0%	-5%	2%
Industrial Market										
Plywood	4,023	4,001	4,275	4,938	4,157	3,853	4,021	3,881	3,681	3,797
OSB	3,046	3,105	3,022	3,060	3,093	2,888	2,968	3,022	2,901	2,929
Total	7,070	7,106	7,297	7,998	7,250	6,741	6,989	6,903	6,582	6,725
% Change	2%	1%	3%	10%	-9%	-7%	4%	-1%	-5%	2%
Nonresidential Market										
Plywood	1,464	1,545	1,588	1,601	1,603	1,515	1,327	1,237	1,252	1,281
OSB	1,821	1,938	1,990	2,011	2,024	1,966	1,795	1,720	1,753	1,797
Total	3,285	3,483	3,578	3,613	3,627	3,481	3,123	2,957	3,005	3,079
% Change	3%	6%	3%	1%	0%	-4%	-10%	-5%	2%	2%
All Domestic Markets										
Plywood	11,253	11,713	12,174	12,739	11,812	11,833	12,637	11,970	10,729	10,949
OSB	20,635	21,740	22,762	23,113	23,021	23,417	25,141	24,063	21,110	21,700
Total	31,889	33,453	34,935	35,853	34,833	35,250	37,778	36,033	31,839	32,649
Volume Change	1,760	1,564	1,483	917	(1,019)	417	2,528	(1,745)	(4,194)	811
% Change	6%	5%	4%	3%	-3%	1%	7%	-5%	-12%	3%
Exports (Outside U.S. & Canada)										
Plywood	323	376	399	332	193	177	284	305	317	332
OSB	490	563	557	528	450	421	310	223	262	272
Total	813	939	956	860	643	598	594	528	579	604
% Change	-24%	15%	2%	-10%	-25%	-7%	-1%	-11%	10%	4%
Less Imports (Outside U.S. & Canada)										
Plywood	743	1,147	1,532	2,299	1,749	1,985	2,229	2,025	1,840	1,805
OSB	11	7	73	43	13	106	601	495	325	250
Total	754	1,154	1,605	2,342	1,762	2,091	2,830	2,520	2,165	2,055
% Change	46%	53%	39%	46%	-25%	19%	35%	-11%	-14%	-5%
Variances*										
Plywood	(153)	(184)	(21)	66	222	190	(436)	(540)	(201)	(146)
OSB	(757)	(461)	(554)	(74)	(473)	(746)	(1,030)	(229)	103	(122)
Total	(910)	(645)	(574)	(9)	(251)	(556)	(1,467)	(768)	(98)	(268)
U.S./Canada Production										
Plywood	10,680	10,758	11,020	10,838	10,478	10,215	10,256	9,710	9,005	9,330
OSB	20,357	21,835	22,692	23,524	22,985	22,986	23,819	23,563	21,150	21,600
Total	31,037	32,593	33,712	34,362	33,463	33,201	34,075	33,273	30,155	30,930
Volume Change	357	1,556	1,119	650	(899)	(262)	874	(802)	(3,118)	775
% Change	1%	5%	3%	2%	-3%	-1%	3%	-2%	-9%	3%
Housing Starts (000)										
All U.S. & Canada	1,381	1,454	1,520	1,566	1,589	1,692	1,966	1,913	1,615	1,630
% Change	10%	5%	5%	3%	1%	6%	16%	-3%	-16%	1%

*Variances: Unexplained differences between demand and production, import and export inaccuracies and inventory changes.

Table 2

U.S. STRUCTURAL PANEL DEMAND & PRODUCTION

Million Square Feet 3/8" Basis

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Residential Market										
Plywood	2,588	2,900	2,969	2,898	2,809	3,087	3,621	3,239	2,444	2,478
OSB	10,106	10,728	11,518	11,810	11,738	12,489	14,081	13,104	10,580	10,987
Total	12,693	13,628	14,487	14,708	14,547	15,576	17,702	16,343	13,024	13,465
% Change	10%	7%	6%	2%	-1%	7%	14%	-8%	-20%	3%
Remodeling Market										
Plywood	1,889	1,950	1,984	1,993	2,002	2,134	2,295	2,295	2,145	2,181
OSB	3,968	4,197	4,330	4,450	4,506	4,569	4,531	4,531	4,339	4,422
Total	5,857	6,146	6,314	6,443	6,508	6,703	6,825	6,825	6,484	6,603
% Change	6%	5%	3%	2%	1%	3%	2%	0%	-5%	2%
Industrial Market										
Plywood	3,506	3,486	3,786	4,452	3,671	3,407	3,564	3,416	3,218	3,335
OSB	2,944	2,999	2,919	2,960	2,986	2,783	2,847	2,891	2,763	2,783
Total	6,450	6,486	6,705	7,412	6,657	6,190	6,411	6,307	5,981	6,118
% Change	2%	1%	3%	11%	-10%	-7%	4%	-2%	-5%	2%
Nonresidential Market										
Plywood	1,283	1,368	1,407	1,428	1,428	1,340	1,154	1,065	1,080	1,109
OSB	1,690	1,809	1,859	1,886	1,895	1,834	1,662	1,585	1,618	1,662
Total	2,973	3,177	3,266	3,315	3,323	3,173	2,815	2,649	2,698	2,771
% Change	4%	7%	3%	1%	0%	-5%	-11%	-6%	2%	3%
All Domestic Markets										
Plywood	9,266	9,704	10,146	10,772	9,910	9,968	10,634	10,015	8,887	9,103
OSB	18,708	19,734	20,625	21,106	21,125	21,674	23,120	22,109	19,300	19,854
Total	27,973	29,437	30,772	31,878	31,035	31,643	33,754	32,124	28,187	28,957
Volume Change	1,682	1,464	1,335	1,107	(843)	607	2,111	(1,629)	(3,938)	770
% Change	6%	5%	5%	4%	-3%	2%	7%	-5%	-12%	3%
Exports										
Plywood	561	613	656	501	341	344	519	505	535	550
OSB	253	246	185	202	203	215	177	155	180	190
Total	814	859	841	703	544	559	696	660	715	740
% Change	-20%	6%	-2%	-16%	-23%	3%	24%	-5%	8%	3%
Less Imports										
Plywood	942	1,383	1,776	2,586	1,979	2,196	2,400	2,257	2,075	2,040
OSB	5,091	5,742	5,948	6,228	5,683	5,745	6,895	6,969	6,390	6,015
Total	6,033	7,125	7,724	8,814	7,662	7,941	9,295	9,226	8,465	8,055
% Change	18%	18%	8%	14%	-13%	4%	17%	-1%	-8%	-5%
Variances*										
Plywood	(133)	(127)	(1)	182	284	209	(416)	(365)	(122)	(63)
OSB	(587)	(316)	(253)	49	(291)	(649)	(765)	52	110	(129)
Total	(720)	(442)	(254)	231	(7)	(441)	(1,180)	(313)	(12)	(192)
U.S. Production										
Plywood	8,751	8,807	9,026	8,869	8,556	8,325	8,337	7,898	7,225	7,550
OSB	13,283	13,922	14,609	15,129	15,354	15,495	15,637	15,348	13,200	13,900
Total	22,034	22,729	23,635	23,998	23,910	23,820	23,974	23,246	20,425	21,450
Volume Change	41	695	906	363	(88)	(90)	154	(728)	(2,821)	1,025
% Change	0%	3%	4%	2%	0%	0%	1%	-3%	-12%	5%
Housing Starts (000)										
Single Family	715	782	843	875	887	990	1,123	1,007	785	825
Multifamily	395	393	372	380	402	389	471	545	485	460
Subtotal	1,110	1,174	1,215	1,255	1,289	1,379	1,594	1,552	1,270	1,285
Manufactured Homes	75	82	93	97	95	95	100	100	100	100
Total	1,185	1,256	1,308	1,352	1,384	1,474	1,694	1,652	1,370	1,385
	11.2%	6.0%	4.1%	3.4%	2.4%	6.5%	14.9%	-2.5%	-17.1%	1.1%
GDP Growth										
	2.9%	1.5%	2.3%	2.9%	2.3%	-3.4%	5.7%	1.5%	-0.3%	1.5%

*Variances: Unexplained differences between demand and production. They are most likely due to import and export inaccuracies or inventory changes. Adjustments are sometimes needed to balance with actual production.

Table 3

CANADA STRUCTURAL PANEL DEMAND & PRODUCTION

Million Square Feet 3/8" Basis

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Residential Market										
Plywood	399	419	443	397	356	371	497	455	390	409
OSB	1,365	1,423	1,532	1,396	1,267	1,100	1,338	1,247	1,102	1,117
Total	1,764	1,843	1,975	1,793	1,623	1,471	1,835	1,702	1,492	1,526
% Change	4%	4%	7%	-9%	-9%	-9%	25%	-7%	-12%	2%
Remodeling Market										
Plywood	890	898	915	911	885	872	877	864	816	804
OSB	329	349	370	386	393	406	427	440	436	448
Total	1,219	1,247	1,285	1,298	1,278	1,278	1,304	1,304	1,252	1,252
% Change	2%	2%	3%	1%	-2%	0%	2%	0%	-4%	0%
Industrial Market										
Plywood	518	515	489	486	486	446	457	465	463	462
OSB	102	105	104	100	107	105	121	131	138	146
Total	620	620	592	585	592	551	579	596	602	608
% Change	0%	0%	-4%	-1%	1%	-7%	5%	3%	1%	1%
Nonresidential Market										
Plywood	181	177	181	173	175	175	174	172	172	172
OSB	131	128	131	125	129	132	134	135	135	135
Total	312	306	312	298	304	307	307	307	307	307
% Change	-4%	-2%	2%	-4%	2%	1%	0%	0%	0%	0%
All Domestic Markets										
Plywood	1,988	2,009	2,028	1,967	1,902	1,865	2,004	1,955	1,842	1,846
OSB	1,928	2,006	2,136	2,007	1,896	1,743	2,020	1,954	1,811	1,846
Total	3,916	4,016	4,164	3,974	3,798	3,607	4,024	3,909	3,652	3,692
Volume Change	78	100	148	(189)	(176)	(190)	417	(116)	(256)	40
% Change	2%	3%	4%	-5%	-4%	-5%	12%	-3%	-7%	1%
Exports										
Plywood	258	295	329	375	317	283	322	315	307	307
OSB	5,417	6,162	6,365	6,617	6,026	5,956	6,533	6,570	6,197	5,897
Total	5,675	6,457	6,694	6,992	6,343	6,239	6,855	6,885	6,504	6,204
% Change	9%	14%	4%	4%	-9%	-2%	10%	0%	-6%	-5%
Less Imports										
Plywood	297	296	343	257	235	239	386	283	290	290
OSB	100	111	118	102	114	120	131	105	115	115
Total	397	407	461	359	349	359	517	388	405	405
% Change	-26%	3%	13%	-22%	-3%	3%	44%	-25%	4%	0%
Variances*										
Plywood	(20)	(57)	(20)	(116)	(62)	(19)	(21)	(175)	(79)	(83)
OSB	(171)	(144)	(300)	(127)	(177)	(88)	(240)	(204)	57	72
Total	(191)	(202)	(320)	(243)	(239)	(106)	(261)	(379)	(21)	(12)
Canada Production										
Plywood	1,929	1,951	1,994	1,969	1,922	1,890	1,919	1,812	1,780	1,780
OSB	7,074	7,913	8,083	8,395	7,631	7,491	8,182	8,215	7,950	7,700
Total	9,003	9,864	10,077	10,364	9,553	9,381	10,101	10,027	9,730	9,480
Volume Change	316	861	213	287	(811)	(172)	720	(74)	(297)	(250)
% Change	4%	10%	2%	3%	-8%	-2%	8%	-1%	-3%	-3%
Housing Starts (000)										
Single Family	101	108	115	101	95	95	125	113	100	100
Multifamily	95	90	97	113	110	123	147	148	145	145
Total	196	198	212	214	205	218	272	261	245	245
GDP Growth										
	0.9%	1.5%	3.2%	1.9%	1.7%	-5.3%	4.5%	3.2%	0.4%	1.5%

*Variances: Unexplained differences between demand and production, import and export inaccuracies and inventory changes.

Market studies for market segment demand in Canada are currently predicting more demand than is calculated from the equation for apparent consumption (known production minus exports, plus imports = consumption). For this reason, the variance estimates shown above are needed.

Table 4

U.S. EXPORTS 3/8" Million Square Feet										
U.S. Exports	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Plywood										
Canada	251	243	271	182	160	178	251	211	225	225
Mexico	124	134	128	120	106	110	177	201	215	225
Caribbean	70	62	72	73	57	43	70	79	75	80
Europe	1	3	8	7	2	4	4	2	5	5
Asia	95	147	153	99	4	3	5	4	5	5
Other	20	24	24	20	12	6	12	8	10	10
Total	561	613	656	501	341	344	519	505	535	550
OSB										
Canada	100	109	114	102	114	120	119	105	115	115
Mexico	62	72	49	59	67	35	33	46	55	65
South America	36	22	0	4	8	6	7	2	5	5
Europe	5	3	2	2	1	1	1	1	5	5
Asia	41	37	14	30	10	50	15	0	0	0
Other	9	3	6	5	3	3	2	1	0	0
Total	253	246	185	202	203	215	177	155	180	190
Plywood & OSB										
Canada	351	352	385	284	274	298	370	316	340	340
Mexico	186	206	177	179	173	145	210	247	270	290
Caribbean	70	62	72	73	57	43	70	79	75	80
South America	36	22	0	4	8	6	7	2	5	5
Europe	6	6	10	9	3	5	5	3	10	10
Asia	136	184	167	129	14	53	20	4	5	5
Other	29	27	30	25	15	9	14	9	10	10
Total	814	859	841	703	544	559	696	660	715	740

Table 5

CANADA EXPORTS 3/8" Million Square Feet										
Canada Exports	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Plywood										
U.S.	245	289	315	362	305	272	306	304	300	300
Mexico	0	0	0	0	0	0	1	0	0	0
Caribbean	0	0	0	0	0	0	0	0	0	0
Europe	11	5	11	9	12	11	13	7	5	5
Asia	1	1	2	3	0	0	2	4	2	2
Other	1	0	1	1	0	0	0	0	0	0
Total	258	295	329	375	317	283	322	315	307	307
OSB										
U.S.	5,080	5,735	5,875	6,183	5,654	5,626	6,265	6,390	6,000	5,700
Mexico	0	1	4	6	11	4	16	7	0	0
Caribbean	0	0	0	0	0	0	0	0	0	0
Europe	7	4	2	1	0	2	0	0	2	2
Japan	180	204	217	217	180	164	153	152	160	160
Other Asia	150	185	247	210	165	159	89	20	30	30
Other	0	33	20	0	16	1	11	1	5	5
Total	5,417	6,162	6,365	6,617	6,026	5,956	6,533	6,570	6,197	5,897
Plywood & OSB										
U.S.	5,325	6,024	6,190	6,545	5,959	5,898	6,571	6,694	6,300	6,000
Mexico	0	1	4	6	11	4	17	7	0	0
Caribbean	0	0	0	0	0	0	0	0	0	0
Europe	18	9	13	10	12	13	13	7	7	7
Japan	180	204	217	217	180	164	153	152	160	160
Other Asia	151	186	249	213	165	159	91	24	32	32
Other	1	33	21	1	16	1	11	1	5	5
Total	5,675	6,457	6,694	6,992	6,343	6,239	6,855	6,885	6,504	6,204

Table 6

U.S. IMPORTS
3/8" Million Square Feet

U.S. Imports	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Plywood										
Canada	245	289	315	362	305	272	306	304	300	300
Brazil	285	599	721	891	869	1,056	1,148	1,006	900	900
Chile	303	385	393	516	475	518	481	522	500	500
Uruguay	34	57	54	46	69	93	102	102	100	90
China	73	50	288	770	230	220	327	298	250	225
Other	2	3	5	1	31	37	36	25	25	25
Total	942	1,383	1,776	2,586	1,979	2,196	2,400	2,257	2,075	2,040
OSB										
Canada	5,080	5,735	5,875	6,183	5,654	5,626	6,265	6,390	6,000	5,700
Ireland	0	0	0	2	16	13	11	38	0	0
Germany	0	0	0	0	0	0	0	6	0	0
Romania	0	0	63	30	3	20	159	78	65	65
Russia	0	0	3	3	0	4	129	65	0	0
UK	0	0	0	0	0	0	16	25	0	0
France	0	0	0	0	0	0	0	0	0	0
Brazil	0	0	0	0	0	0	0	5	0	0
Chile	0	0	0	0	0	0	2	10	0	0
Other	11	7	7	10	10	82	313	352	325	250
Total	5,091	5,742	5,948	6,228	5,683	5,745	6,895	6,969	6,390	6,015
Plywood & OSB										
Canada	5,325	6,024	6,190	6,545	5,959	5,898	6,571	6,694	6,300	6,000
Brazil	285	599	721	891	869	1,056	1,148	1,011	900	900
Chile	303	385	393	516	475	518	483	532	500	500
Uruguay	34	57	54	46	69	93	102	102	100	90
China	73	50	288	770	230	220	327	298	250	225
Ireland	0	0	0	2	16	13	11	38	0	0
Germany	0	0	0	0	0	0	0	6	0	0
UK	0	0	0	0	0	0	16	25	0	0
France	0	0	0	0	0	0	0	0	0	0
Other	13	10	78	44	44	143	637	520	415	340
Total	6,033	7,125	7,724	8,814	7,662	7,941	9,295	9,226	8,465	8,055

Table 7

CANADA IMPORTS
3/8" Million Square Feet

Canada Imports	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Plywood										
U.S.	251	243	271	182	160	178	251	211	225	225
Brazil	4	7	15	10	10	12	31	25	15	15
Chile	17	18	30	30	30	22	17	14	20	20
Finland	0	0	1	0	0	0	0	0	0	0
Germany	1	0	0	0	0	0	0	1	0	0
China	22	23	23	30	30	22	71	25	25	25
Other	2	5	3	5	5	5	16	7	5	5
Total	297	296	343	257	235	239	386	283	290	290
OSB										
U.S.	100	109	114	102	114	120	119	105	115	115
Germany	0	0	0	0	0	0	0	0	0	0
Poland	0	0	0	0	0	0	0	0	0	0
France	0	0	0	0	0	0	0	0	0	0
China	0	1	0	0	0	0	11	0	0	0
Other	0	1	4	0	0	0	1	0	0	0
Total	100	111	118	102	114	120	131	105	115	115
Plywood & OSB										
U.S.	351	352	385	284	274	298	370	316	340	340
Brazil	4	7	15	10	10	12	31	25	15	15
Chile	17	18	30	30	30	22	17	14	20	20
Finland	0	0	1	0	0	0	0	0	0	0
Germany	1	1	0	0	0	0	11	1	0	0
Poland	0	0	0	0	0	0	0	0	0	0
France	0	0	0	0	0	0	0	0	0	0
China	22	24	23	30	30	22	82	25	25	25
Other	2	6	7	5	5	5	17	7	5	5
Total	397	407	461	359	349	359	517	388	405	405

Table 8

NORTH AMERICA CAPACITY AND PRODUCTION
3/8" Million Square Feet

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Plywood										
Capacity	14,349	13,449	13,769	13,645	13,340	13,340	13,340	13,340	13,340	13,340
Production	10,680	10,758	11,020	10,838	10,478	10,215	10,256	9,710	9,005	9,330
Capacity Utilization	74%	80%	80%	79%	79%	77%	77%	73%	68%	70%
OSB										
Capacity	28,585	28,780	28,975	29,570	30,015	29,955	30,325	30,570	30,965	32,260
Production	20,357	21,835	22,692	23,524	22,985	22,986	23,819	23,563	21,150	21,600
Capacity Utilization	71%	76%	78%	80%	77%	77%	79%	77%	68%	67%
Total										
Capacity	42,934	42,229	42,744	43,215	43,355	43,295	43,665	43,910	44,305	45,600
Production	31,037	32,593	33,712	34,362	33,463	33,201	34,075	33,273	30,155	30,930
Capacity Utilization	72%	77%	79%	80%	77%	77%	78%	76%	68%	68%

Table 9

NORTH AMERICA PLYWOOD CAPACITY AND PRODUCTION
3/8" Million Square Feet

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
West										
Capacity	3,199	3,174	3,224	3,100	3,100	3,100	3,100	3,100	3,100	3,100
Production	2,783	2,676	2,627	2,587	2,477	2,413	2,504	2,333	2,000	2,100
Capacity Utilization	87%	84%	81%	83%	80%	78%	81%	75%	65%	68%
Inland										
Capacity	1,070	955	965	885	785	785	785	785	785	785
Production	841	829	775	776	742	641	597	598	525	550
Capacity Utilization	79%	87%	80%	88%	95%	82%	76%	76%	67%	70%
South										
Capacity	7,940	7,160	7,400	7,460	7,255	7,255	7,255	7,255	7,255	7,255
Production	5,127	5,302	5,624	5,506	5,337	5,271	5,236	4,967	4,700	4,900
Capacity Utilization	65%	74%	76%	74%	74%	73%	72%	68%	65%	68%
Total U.S.										
Capacity	12,209	11,289	11,589	11,445	11,140	11,140	11,140	11,140	11,140	11,140
Production	8,751	8,807	9,026	8,869	8,556	8,325	8,337	7,898	7,225	7,550
Capacity Utilization	72%	78%	78%	77%	77%	75%	75%	71%	65%	68%
Canada										
Capacity	2,140	2,160	2,180	2,200	2,200	2,200	2,200	2,200	2,200	2,200
Production	1,929	1,951	1,994	1,969	1,922	1,890	1,919	1,812	1,780	1,780
Capacity Utilization	90%	90%	91%	90%	87%	86%	87%	82%	81%	81%
Total North America										
Capacity	14,349	13,449	13,769	13,645	13,340	13,340	13,340	13,340	13,340	13,340
Production	10,680	10,758	11,020	10,838	10,478	10,215	10,256	9,710	9,005	9,330
Capacity Utilization	74%	80%	80%	79%	79%	77%	77%	73%	68%	70%

Assumption: New capacity is added on a "ramped up" basis with a portion added first year, second year and, for some, a third year.
Capacity includes a forecast of new mills as well as capacity resulting from mill modernization and closures.
Temporary closures are not included.

Table 10

NORTH AMERICA OSB CAPACITY AND PRODUCTION
3/8" Million Square Feet

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
North & Inland										
Capacity	3,055	3,075	3,095	3,115	3,135	3,155	3,175	3,195	3,215	3,435
Production	2,608	2,748	2,856	2,698	2,722	2,696	2,894	2,860	2,400	2,300
Capacity Utilization	85%	89%	92%	87%	87%	85%	91%	90%	75%	67%
South										
Capacity	14,760	14,860	14,960	15,460	15,810	16,010	16,110	16,210	16,510	17,410
Production	10,675	11,174	11,753	12,431	12,632	12,799	12,743	12,488	10,800	11,600
Capacity Utilization	72%	75%	79%	80%	80%	80%	79%	77%	65%	67%
Total U.S.										
Capacity	17,815	17,935	18,055	18,575	18,945	19,165	19,285	19,405	19,725	20,845
Production	13,283	13,922	14,609	15,129	15,354	15,495	15,637	15,348	13,200	13,900
Capacity Utilization	75%	78%	81%	81%	81%	81%	81%	79%	67%	67%
Canada										
Capacity	10,770	10,845	10,920	10,995	11,070	10,790	11,040	11,165	11,240	11,415
Production	7,074	7,913	8,083	8,395	7,631	7,491	8,182	8,215	7,950	7,700
Capacity Utilization	66%	73%	74%	76%	69%	69%	74%	74%	71%	67%
Total North America										
Capacity	28,585	28,780	28,975	29,570	30,015	29,955	30,325	30,570	30,965	32,260
Production	20,357	21,835	22,692	23,524	22,985	22,986	23,819	23,563	21,150	21,600
Capacity Utilization	71%	76%	78%	80%	77%	77%	79%	77%	68%	67%

Assumption: New capacity is added on a "ramped up" basis with a portion added first year, second year and, for some, a third year.
Capacity includes a forecast of new mills as well as capacity resulting from mill modernization and closures.
Temporary closures are not included.

Table 11

PLYWOOD CAPACITY CHANGES

Million Sq. Ft. 3/8" Basis

	West				North & Inland			
	New Mills ¹	Closures	Creep/Downsize ²	Net	New Mills ¹	Closures	Creep/Downsize ²	Net
2015	0	(88)	30	(58)	0	0	10	10
2016	120	(175)	30	(25)	0	(125)	10	(115)
2017	165	(145)	30	50	0	0	10	10
2018	0	0	(124)	(124)	0	0	(80)	(80)
2019	0	0	0	0	0	0	100	100
2020	0	0	0	0	0	0	(100)	(100)
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0

	South				Total U.S.			
	New Mills ¹	Closures	Creep/Downsize ²	Net	New Mills ¹	Closures	Creep/Downsize ²	Net
2015	0	0	195	195	0	(88)	235	147
2016	140	(920)	80	(700)	260	(1,220)	120	(840)
2017	240	0	70	310	0	(145)	110	(35)
2018	60	0	80	140	0	0	(124)	(124)
2019	0	(205)	80	(125)	0	(205)	180	(25)
2020	0	0	0	0	0	0	(100)	(100)
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0

	Canada				Total North America			
	New Mills ¹	Closures	Creep/Downsize ²	Net	New Mills ¹	Closures	Creep/Downsize ²	Net
2015	0	0	20	20	0	(88)	255	167
2016	0	0	20	20	260	(1,220)	140	(820)
2017	0	0	20	20	0	(145)	130	(15)
2018	0	0	20	20	0	0	(104)	(104)
2019	0	0	20	20	0	(205)	200	(5)
2020	0	0	20	20	0	0	(80)	(80)
2021	0	0	20	20	0	0	20	20
2022	0	0	20	20	0	0	20	20
2023	0	0	20	20	0	0	20	20
2024	0	0	1	1	0	0	1	1

¹ New capacity is added on a "ramped up" basis with a portion added first year, second year and, for some, a third year.

² Creep includes increases due to productivity and/or equipment. Mills may downsize because of equipment removal or a shift in strategy to sell veneer, for example. Plywood creep of 440 million in 2003 reflects the ability of several mills to produce more.

Table 12

OSB CAPACITY CHANGES

Million Sq. Ft. 3/8" Basis

U.S. North & Inland OSB					U.S. South OSB			
	New Mills ¹	Closures	Creep/Downsize ²	Net	New Mills ¹	Closures	Creep/Downsize ²	Net
2015	0	0	20	20	0	0	150	150
2016	0	0	20	20	0	0	150	150
2017	0	0	20	20	0	0	150	150
2018	0	0	20	20	400	0	150	550
2019	0	0	20	20	250	0	150	400
2020	0	0	20	20	100	0	150	250
2021	0	0	20	20	0	0	150	150
2022	0	0	20	20	0	0	150	150
2023	0	0	20	20	250	0	150	400
2024	200	0	20	220	250	0	150	400
TOTAL U.S. OSB					Canada OSB			
	New Mills ¹	Closures	Creep/Downsize ²	Net	New Mills ¹	Closures	Creep/Downsize ²	Net
2015	0	0	170	170	500	0	75	575
2016	0	0	170	170	0	0	75	75
2017	0	0	170	170	0	0	75	75
2018	0	0	170	170	0	0	75	75
2019	25	0	170	195	0	0	75	75
2020	100	0	170	270	105	(460)	75	(280)
2021	200	0	170	370	175	0	75	250
2022	125	0	170	295	50	0	75	125
2023	250	0	170	420	200	0	75	275
2024	450	0	170	620	300	0	75	375
TOTAL NORTH AMERICA OSB								
	New Mills ¹	Closures	Creep/Downsize ²	Net				
2012	400	0	(125)	275				
2013	1,550	(475)	220	1,295				
2014	400	0	485	885				
2015	500	0	245	745				
2016	0	0	245	245				
2017	0	0	245	245				
2018	0	0	245	245				
2019	130	0	245	375				
2020	275	(460)	245	60				
2021	250	0	245	495				
2022	325	0	245	570				
2023	450	0	245	695				
2024	750	0	245	995				
2025	600	0	245	845				
2026	150	0	245	395				

¹ Includes re-opening after a lengthy closure.² Creep includes increases due to productivity and/or equipment. Mills may downsize because of equipment removal, for example.

TOTAL NET CAPACITY CHANGES								
	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>6-Year Total</u>
Plywood	140	140	140	140	140	140	140	980
OSB	60	495	370	245	245	245	245	1,905
Total	200	635	510	385	385	385	385	2,885

Table 13

U.S. FLOOR SHEATHING										
3/8" Million Square Feet										
U.S. Floor Sheathing	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Single-family										
Plywood	457	487	521	510	532	576	669	549	423	403
OSB	1,732	1,888	2,039	2,084	2,083	2,207	2,538	2,273	1,750	1,852
Other	0	0	0	0	0	0	1	2	3	4
Total	2,189	2,376	2,559	2,594	2,615	2,783	3,208	2,824	2,177	2,259
Multifamily										
Plywood	120	122	105	108	110	103	122	129	111	105
OSB	427	453	424	438	439	412	486	601	518	491
Other	0	0	0	0	0	0	1	2	3	4
Total	548	575	529	546	549	514	609	732	632	600
Manufactured Homes										
Plywood	48	53	60	62	60	58	60	60	60	60
OSB	88	99	113	117	118	119	127	127	129	132
Other	73	77	88	91	88	88	93	93	90	87
Total	210	229	260	271	265	265	279	279	279	279
Total Floor Sheathing										
Plywood	625	662	685	680	701	737	851	738	594	568
OSB	2,248	2,440	2,576	2,640	2,640	2,738	3,151	3,000	2,397	2,475
Other	73	77	88	91	88	88	95	97	96	95
Total	2,946	3,179	3,349	3,411	3,429	3,563	4,096	3,835	3,088	3,139

Other – Mostly particleboard floor sheathing used in manufactured homes.

Table 14

U.S. WALL SHEATHING										
3/8" Million Square Feet										
U.S. Wall Sheathing	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Single-family										
Plywood	323	493	460	433	423	467	543	445	343	359
OSB	2,413	2,464	2,808	2,850	2,800	3,051	3,394	3,008	2,352	2,498
Other	630	627	571	639	644	752	1,016	954	702	700
Total	3,366	3,584	3,839	3,922	3,867	4,270	4,953	4,407	3,396	3,557
Multifamily										
Plywood	39	50	47	45	44	39	45	51	42	40
OSB	332	340	316	321	332	309	365	441	383	363
Other	111	95	88	96	95	93	112	129	109	104
Total	482	486	451	462	471	442	522	621	534	507
Manufactured Homes										
Plywood	1	2	2	2	2	2	2	2	2	2
OSB	102	113	130	137	136	136	145	147	149	150
Other	34	36	39	39	37	37	37	35	33	31
Total	138	150	171	178	174	174	183	183	183	183
Total Wall Sheathing										
Plywood	363	545	509	480	468	508	590	498	387	400
OSB	2,847	2,917	3,253	3,308	3,268	3,496	3,904	3,597	2,883	3,011
Other	775	759	698	775	775	882	1,164	1,117	844	835
Total	3,985	4,221	4,460	4,562	4,512	4,886	5,658	5,211	4,114	4,247

Other – Mostly foam sheathing and masonry. Other types include foil-faced Kraft and walls without sheathing.

Table 15

U.S. ROOF SHEATHING
3/8" Million Square Feet

U.S. Roof Sheathing	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Single-family										
Plywood	1,117	1,191	1,273	1,241	1,170	1,325	1,578	1,398	975	1,020
OSB	3,229	3,467	3,728	3,835	3,868	4,247	4,874	4,320	3,456	3,618
Other	83	67	48	73	48	53	92	82	21	22
Total	4,429	4,725	5,048	5,149	5,086	5,625	6,543	5,801	4,452	4,660
Multifamily										
Plywood	169	171	155	152	149	139	164	196	165	156
OSB	488	497	464	478	491	460	544	648	562	533
Other	9	6	6	9	12	11	13	16	13	13
Total	666	674	625	639	651	610	721	860	740	702
Manufactured Homes										
Plywood	11	12	13	14	13	12	11	11	11	11
OSB	209	228	259	270	265	266	281	281	281	281
Other	0	0	0	0	0	0	1	2	3	4
Total	219	240	272	284	278	278	294	295	296	297
Total Roof Sheathing										
Plywood	1,296	1,374	1,441	1,407	1,331	1,476	1,754	1,606	1,151	1,188
OSB	3,926	4,192	4,451	4,583	4,625	4,974	5,699	5,250	4,300	4,432
Other	92	73	53	82	59	64	106	100	37	39
Total	5,315	5,639	5,945	6,072	6,015	6,513	7,558	6,956	5,488	5,659

Other – Mostly 3/8" equivalent of lumber sheathing.

Table 16

U.S. REMODELING MARKET
3/8" Million Square Feet

U.S. Remodeling	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Additions, Alterations, Replacement										
Plywood	1,577	1,629	1,657	1,660	1,665	1,776	1,937	1,937	1,810	1,847
OSB	3,769	3,987	4,116	4,228	4,282	4,349	4,311	4,311	4,125	4,208
Total	5,347	5,616	5,773	5,888	5,947	6,126	6,248	6,248	5,936	6,054
Maintenance, Repairs and Home Projects										
Plywood	311	321	328	333	336	358	358	358	335	335
OSB	199	210	214	222	224	219	219	219	214	214
Total	510	531	541	555	561	577	577	577	548	548
Total U.S. Remodeling										
Plywood	1,889	1,950	1,984	1,993	2,002	2,134	2,295	2,295	2,145	2,181
OSB	3,968	4,197	4,330	4,450	4,506	4,569	4,531	4,531	4,339	4,422
Total	5,857	6,146	6,314	6,443	6,508	6,703	6,825	6,825	6,484	6,603

Table 17

U.S. INDUSTRIAL MARKET										
3/8" Million Square Feet										
U.S. Industrial	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Transportation										
Plywood	1,496	1,526	1,556	1,541	1,448	1,347	1,420	1,278	1,150	1,224
OSB	582	593	605	599	563	524	525	473	425	430
Total	2,077	2,119	2,161	2,140	2,011	1,871	1,945	1,751	1,576	1,655
Materials Handling										
Plywood	585	591	589	586	581	537	570	579	562	579
OSB	459	464	482	499	505	476	505	535	530	524
Total	1,044	1,055	1,070	1,085	1,087	1,014	1,075	1,114	1,092	1,103
Furniture and Fixtures										
Plywood	894	825	802	778	703	659	695	675	649	676
OSB	894	931	905	914	859	790	783	825	761	762
Total	1,788	1,756	1,707	1,692	1,563	1,449	1,478	1,500	1,410	1,438
Other Industrial										
Plywood	531	545	839	1,547	938	863	880	883	856	855
OSB	1,009	1,011	927	948	1,058	993	1,033	1,058	1,046	1,066
Total	1,540	1,556	1,766	2,496	1,997	1,857	1,913	1,941	1,903	1,922
Total Industrial										
Plywood	3,506	3,486	3,786	4,452	3,671	3,407	3,564	3,416	3,218	3,335
OSB	2,944	2,999	2,919	2,960	2,986	2,783	2,847	2,891	2,763	2,783
Total	6,450	6,486	6,705	7,412	6,657	6,190	6,411	6,307	5,981	6,118

Table 18

U.S. NONRESIDENTIAL CONSTRUCTION MARKET										
3/8" Million Square Feet										
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Building Construction										
Plywood	573	640	669	684	664	632	522	469	467	476
OSB	634	722	754	771	779	772	664	622	645	658
Total	1,207	1,361	1,423	1,455	1,443	1,403	1,185	1,090	1,112	1,135
Other Construction*										
Plywood	498	503	503	503	520	490	444	428	440	451
OSB	714	721	721	721	700	690	670	670	670	689
Total	1,212	1,224	1,224	1,224	1,220	1,180	1,114	1,098	1,110	1,140
Remodeling										
Plywood	199	225	235	242	244	218	189	168	174	181
OSB	325	367	383	394	416	372	328	293	302	316
Total	525	592	618	636	660	590	517	461	476	497
Total U.S. Nonresidential										
Plywood	1,271	1,368	1,407	1,428	1,428	1,340	1,154	1,065	1,080	1,109
OSB	1,673	1,809	1,859	1,886	1,895	1,834	1,662	1,585	1,618	1,662
Total	2,943	3,177	3,266	3,315	3,323	3,173	2,815	2,649	2,698	2,771

Other – Mostly non-building construction such as bridges, highways, sewer and water treatment.

Table 19

CANADA FLOOR SHEATHING
3/8" Million Square Feet

Canada Floor Sheathing	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Single-family										
Plywood	62	67	69	60	49	51	69	61	47	51
OSB	253	271	281	242	205	200	268	233	188	204
Other	3	7	7	6	4	26	41	40	39	39
Total	318	345	358	308	258	277	379	333	274	294
Multifamily										
Plywood	51	51	58	55	57	59	70	70	68	68
OSB	160	149	172	173	168	162	167	167	161	155
Other	0	0	0	0	0	0	1	2	3	4
Total	211	200	230	228	225	221	239	240	232	226
Total Floor Sheathing										
Plywood	112	117	128	115	106	110	139	131	115	119
OSB	413	420	454	415	373	362	436	400	350	359
Other	3	7	7	6	4	26	42	42	42	43
Total	528	545	589	536	483	498	618	573	506	520

Other – Mostly lumber.

Table 20

CANADA WALL SHEATHING
3/8" Million Square Feet

Canada Wall Sheathing	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Single-family										
Plywood	33	36	37	32	27	29	48	42	29	31
OSB	197	214	222	191	162	159	200	187	153	147
Other	99	107	111	95	81	101	152	123	107	135
Total	328	357	371	318	270	289	400	352	289	313
Multifamily										
Plywood	18	17	20	21	20	19	22	22	21	21
OSB	149	142	164	157	140	128	133	133	128	122
Other	62	59	68	83	109	131	178	178	172	178
Total	229	219	252	261	270	278	333	333	321	321
Total Wall Sheathing										
Plywood	51	53	57	53	47	48	70	64	50	52
OSB	346	356	386	347	302	287	333	320	282	269
Other	160	166	179	179	190	232	330	301	279	313
Total	558	575	622	579	540	568	733	685	610	634

Other – Mostly foam and fibreboard sheathing. Other types include foil-faced Kraft and walls without sheathing.

Table 21

CANADA ROOF SHEATHING										
3/8" Million Square Feet										
Canada Roof Sheathing	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Single-family										
Plywood	122	132	133	114	95	101	137	118	97	105
OSB	221	240	245	211	173	179	238	209	172	183
Other	26	28	37	32	35	45	74	67	55	63
Total	369	400	416	357	303	325	449	395	325	352
Multifamily										
Plywood	54	51	57	57	56	56	64	64	70	70
OSB	136	130	145	142	140	135	153	147	142	142
Other	2	2	8	20	29	42	61	67	56	56
Total	191	183	210	218	225	233	278	278	268	268
Total Roof Sheathing										
Plywood	175	183	190	171	152	156	201	182	167	175
OSB	357	370	390	352	312	313	391	357	314	325
Other	28	30	46	52	64	87	135	134	111	120
Total	560	583	626	575	528	557	727	673	593	620

Other – Mostly 3/8" equivalent of lumber sheathing.

Table 22

CANADA REMODELING MARKET										
3/8" Million Square Feet										
Canada Remodeling	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Plywood	890	898	915	911	885	872	877	864	816	804
OSB	329	349	370	386	393	406	427	440	436	448
Total	1,219	1,247	1,285	1,298	1,278	1,278	1,304	1,304	1,252	1,252

Table 23

CANADA INDUSTRIAL MARKET										
3/8" Million Square Feet										
Canada Industrial	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Plywood	518	515	489	486	486	446	457	465	463	462
OSB	102	105	104	100	107	105	121	131	138	146
Total	620	620	592	585	592	551	579	596	602	608

Table 24

CANADA NONRESIDENTIAL CONSTRUCTION MARKET										
3/8" Million Square Feet										
Canada Nonresidential	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Plywood	181	177	181	173	175	175	174	172	172	172
OSB	131	128	131	125	129	132	134	135	135	135
Total	312	306	312	298	304	307	307	307	307	307

Table 25

STRUCTURAL PANEL MANUFACTURERS IN NORTH AMERICA

March 2023

<u>Company</u>	<u>City</u>	<u>State</u>	<u>Country</u>	<u>Plywood</u>	<u>OSB</u>
Arbec Forest Products	Shawnigan	QC	Can		X
Arbec Forest Products	Miramichi	NB	Can		X
Aspen Planers Ltd.	Savona	BC	Can	X	
Bessemer Plywood Corporation	Bessemer	MI	US	X	
Boise Cascade Company	Elgin	OR	US	X	
Boise Cascade Company	Florien	LA	US	X	
Boise Cascade Company	Kettle Falls	WA	US	X	
Boise Cascade Company	Medford	OR	US	X	
Boise Cascade Company	Oakdale	LA	US	X	
Boise Cascade Company	Chester	SC	US	X	
Boise Cascade Company	Chapman	AL	US	X	
Boise Cascade Company	Havannah	FL	US	X	
Canoe Forest Products	Canoe	BC	Can	X	
Eagle Veneer, Inc.	Harrisburg	OR	US	X	
Emerald Forest Products	Eugene	OR	US	X	
Forex Amos, Inc.	Amos	QC	Can		X
Freres Lumber Company	Mill City	OR	US	X	
Georgia-Pacific Wood Products LLC	Brookneal	VA	US		X
Georgia-Pacific Wood Products LLC	Camden	TX	US	X	
Georgia-Pacific Wood Products LLC	Clarendon	SC	US		X
Georgia-Pacific Wood Products LLC	Corrigan	TX	US	X	
Georgia-Pacific Wood Products LLC	Dudley	NC	US	X	
Georgia-Pacific Wood Products LLC	Emporia	VA	US	X	
Georgia-Pacific Wood Products LLC	Englehart	ON	Can		X
Georgia-Pacific Wood Products LLC	Fordyce	AR	US		X
Georgia-Pacific Wood Products LLC	Grenada	MS	US		X
Georgia-Pacific Wood Products LLC	Gurdon	AR	US	X	
Georgia-Pacific Wood Products LLC	Hawthorne	FL	US	X	
Georgia-Pacific Wood Products LLC	Hosford	FL	US		X
Georgia-Pacific Wood Products LLC	Madison	GA	US	X	
Georgia-Pacific Wood Products LLC	Mt. Hope	WV	US		X
Georgia-Pacific Wood Products LLC	Prosperity	SC	US	X	
Georgia-Pacific Wood Products LLC	Russellville	SC	US	X	
Georgia-Pacific Wood Products LLC	Skipppers	VA	US		X
Georgia-Pacific Wood Products LLC	Taylorsville	MS	US	X	
Georgia-Pacific Wood Products LLC	Whiteville	NC	US	X	
Hardel Mutual Plywood Corp.	Chehalis	WA	US	X	
Hood Industries, Inc.	Beaumont	MS	US	X	
Hood Industries, Inc.	Wiggins	MS	US	X	
Huber Engineered Woods	Broken Bow	OK	US		X
Huber Engineered Woods	Commerce	GA	US		X
Huber Engineered Woods	Crystal Hill	VA	US		X
Huber Engineered Woods	Easton	ME	US		X
Huber Engineered Woods	Spring City	TN	US		X

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Table 25 - Continued

STRUCTURAL PANEL MANUFACTURERS IN NORTH AMERICA

March 2023

<u>Company</u>	<u>City</u>	<u>State</u>	<u>Country</u>	<u>Plywood</u>	<u>OSB</u>
Hunt Plywood Company, Inc.	Pollock	LA	US	X	
Langboard, Inc.	Quitman	GA	US		X
Louisiana-Pacific Canada Ltd.	Dawson Creek	BC	Can		X
Louisiana-Pacific Canada Ltd.	Maniwaki	QC	Can		X
Louisiana-Pacific Canada Ltd.	Minitonas	MB	Can		X
Louisiana-Pacific Canada Ltd.	Golden	BC	Can	X	
Louisiana-Pacific Canada Ltd.	Val d'Or	QC	Can		X
LP Peace Valley	Ft. St. John	BC	Can		X
LP	Carthage	TX	US		X
LP	Hanceville	AL	US		X
LP	Hayward	WI	US		X
LP	Houlton	ME	US		X
LP	Jasper	TX	US		X
LP	Newberry	MI	US		X
LP	Roxboro	NC	US		X
LP	Sagola	MI	US		X
LP Clarke County	Thomasville	AL	US		X
LP	Tomahawk	WI	US		X
LP	Two Harbors	MN	US		X
Murphy Plywood Company	Rogue Valley	OR	US	X	
Natron Wood Products	Jasper	OR	US	X	
Pacific Wood Laminates	Brookings	OR	US	X	
Potlatch Corporation	St. Maries	ID	US	X	
Richmond Plywood Corporation Ltd.	Richmond	BC	Can	X	
Roseburg Forest Products Co.	Dillard	OR	US	X	
Roseburg Forest Products Co.	Riddle #4	OR	US	X	
Roseburg Forest Products Co.	Coquille #6	OR	US	X	
RoyOMartin Oakdale	Oakdale	LA	US		X
RoyOMartin Chopin	Chopin	LA	US	X	
RoyOMartin Corrigan	Corrigan	TX	US	X	
S.D.S. Lumber Company	Bingen	WA	US	X	
Scotch Plywood Company of Alabama	Fulton	AL	US	X	
Southern Veneer Products	Fitzgerald	GA	US	X	
Southern Veneer Specialty Products	Moncure	NC	US	X	
Swanson Group	Glendale	OR	US	X	
Swanson Group	Springfield	OR	US	X	
Thompson River Veneer Products	Kamloops	BC	Can	X	
Timber Products Company	Grants Pass II	OR	US	X	
Timber Products Company	Medford	OR	US	X	
Tolko Industries Ltd.	Armstrong	BC	Can	X	
Tolko Industries Ltd.	High Prairie	AB	Can		X
Tolko Industries Ltd.	Kamloops	BC	Can	X	
Tolko Industries Ltd./Athabasca Division	Slave Lake	AB	Can		X
Tolko Industries Ltd./Meadow Lake OSB Partnership	Meadow Lake	SK	Can		X
West Fraser Mills, Ltd.	La Sarre	QC	Can		X
West Fraser Mills, Ltd.	Cordele	GA	US		X
West Fraser Mills, Ltd.	Guntown	MS	US		X
West Fraser Mills, Ltd.	Huguley	AL	US		X
West Fraser Mills, Ltd.	Jefferson	TX	US		X
West Fraser Mills, Ltd.	Joanna	SC	US		X

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Table 25- Continued

STRUCTURAL PANEL MANUFACTURERS IN NORTH AMERICA

March 2023

<u>Company</u>	<u>City</u>	<u>State</u>	<u>Country</u>	<u>Plywood</u>	<u>OSB</u>
West Fraser Mills, Ltd.	Chambord	QC	Can		X
West Fraser Mills, Ltd.	Allendale	SC	US		X
West Fraser Mills, Ltd.	Nacogdoches	TX	US		X
West Fraser Mills, Ltd.	Solway	MN	US		X
West Fraser Mills, Ltd.	Grande Prairie	AB	Can		X
West Fraser Mills, Ltd.	100 Mile House	BC	Can		X
West Fraser Mills, Ltd.	Barwick	ON	Can		X
West Fraser Mills, Ltd.	High Level	AB	Can		X
West Fraser Mills, Ltd.	Edmonton	AB	Can	X	
West Fraser Mills, Ltd.	Quesnel	BC	Can	X	
West Fraser Mills, Ltd.	Williams Lake	BC	Can	X	
Westlam Industries Ltd.	Langley	BC	Can	X	
Weyerhaeuser	Edson	AB	Can		X
Weyerhaeuser	Hudson Bay	SK	Can		X
Weyerhaeuser	Elkin	NC	US		X
Weyerhaeuser	Grayling	MI	US		X
Weyerhaeuser	Sutton	WV	US		X
Weyerhaeuser	Arcadia	LA	US		X
Weyerhaeuser	Emerson	AR	US	X	
Weyerhaeuser	Zwolle	LA	US	X	
Weyerhaeuser	Evergreen	MT	US	X	
Winston Plywood and Veneer	Louisville	MS	US	X	

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Table 26

January 2023

STRUCTURAL PANEL AND ENGINEERED WOOD PRODUCTS STARTS AND CLOSURES 2014 – 2022

2022

The following mills are to begin production in 2022:

ENGINEERED WOOD PRODUCTS

AcuTruss Industries 1996 (LTD), Kelowna, BC (I-joist)	March
Element5 Limited Partnership, St. Thomas, ON (Glulam and CLT)	March

The following mills closed permanently in 2022:

2021

The following mills are to begin production in 2021:

ENGINEERED WOOD PRODUCTS

Structurlam Mass Timber U.S., Inc. Conway, AR (Glulam and CLT)	October
--	---------

The following mills closed permanently in 2021:

2020

The following mills are to begin production in 2020:

The following mills closed permanently in 2020:

ENGINEERED WOOD PRODUCTS

Boise Cascade Roxboro, NC (I-joist)	February
OSB	
Norbord Inc., 100 Mile House, BC	November

2019

The following mills are to begin production in 2019:

OSB

Forex Amos, Inc. Amos, QC	December
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ENGINEERED WOOD PRODUCTS

Rosboro Lumber Co purchase of Western Structures (Glulam)	January
Vaagen Timber, Colville, WA (Glulam and CLT)	June
Roseburg South, Chester SC (SCL)	September
Kalesnikoff Mass Timber Inc., Thrums, BC	December

The following mills closed permanently in 2019:

ENGINEERED WOOD PRODUCTS

Western Structures -Eugene, OR (Glulam) purchased by Rosboro	January
International Beam, Tillsonburg, ON (I-joist)	May

2018

The following mills are to begin production in 2018:

OSB

RoyOMartin, Corrigan, TX	June
--------------------------	------

ENGINEERED WOOD PRODUCTS

Freres Lumber (CLT)	August
International Beams, Dothan, AL (CLT)	June
Tolko Industries Ltd. Athabasca, AB (OSL)	September

The following mills closed permanently in 2018:

Plywood

Georgia-Pacific Corporation Warm Springs, GA	December
--	----------

ENGINEERED WOOD PRODUCTS

Boise Cascade Roxboro, NC (LVL)	December
---------------------------------	----------

2017

The following mills are to begin production in 2017:

The following mills closed permanently in 2017:

GLULAM

TECOLAM INC., Val-d'Or, QC (Glulam)	October
-------------------------------------	---------

2016

The following mills are to begin production in 2016:

PLYWOOD

Swanson Group Mfg. LLC, Springfield Plywood and Veneer	May
Winston Plywood and Veneer, Louisville, MS - Rebuild	October

The following mills closed permanently in 2016:

PLYWOOD

Olympic Panel Products, Shelton, WA	July
Weyerhaeuser, Columbia Falls, MT	Sept

2015

The following mills are to begin production in 2015:

None

The following mills closed permanently in 2015:

None

2014

The following mills are to begin production in 2014:

The following mills closed permanently in 2014:

PLYWOOD

Swanson Group Mfg. LLC, Springfield Plywood and Veneer - Fire	July
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Table 27

2022 STRUCTURAL PANEL PRODUCERS BY COUNTRY BY PRODUCT
Ranked By Size
Million Sq. Ft. 3/8" Basis

U.S. PLYWOOD PRODUCERS

Georgia-Pacific Wood Products LLC
Boise Cascade Company
Roseburg Forest Products Co.
RoyOMartin
Swanson Group
Hunt Plywood Company, Inc.
Winston Plywood and Veneer
Scotch Plywood Co. of Alabama
Hardel Mutual Plywood Corp.
Murphy Plywood Company
Hood Industries, Inc.
Emerald Forest Products
Pacific Wood Laminates
Weyerhaeuser
Southern Veneer Products
Freres Lumber Company
Timber Forest Products, Inc.
Natron Wood Products
Potlatch Corporation
S.D.S. Lumber Company
Bessemer Plywood Corporation
Eagle Veneer, Inc.

Total U.S. Plywood Production 7,898

CANADA PLYWOOD PRODUCERS

West Fraser
Tolko Industries Ltd.
Richmond Plywood Corporation Ltd.
Canoe Forest Products
Westlam Industries
Aspen Planers Ltd.
Thompson River Veneer Products
Louisiana-Pacific Canada Ltd.

Total Canada Plywood Production 1,812

NORTH AMERICA PLYWOOD PRODUCERS

Georgia-Pacific Wood Products LLC
Boise Cascade Company
West Fraser
Roseburg Forest Products Co.
RoyOMartin
Tolko Industries Ltd.
Swanson Group
Hunt Plywood Company, Inc.
Richmond Plywood Corporation Ltd.
Winston Plywood and Veneer
Weyerhaeuser
Scotch Plywood Co. of Alabama
Hardel Mutual Plywood Corp.
Murphy Plywood Company
Hood Industries, Inc.
Emerald Forest Products
Pacific Wood Laminates
Canoe Forest Products
Westlam Industries
Southern Veneer Products
Freres Lumber Company
Aspen Planers Ltd.
Timber Forest Products, Inc.
Natron Wood Products
Potlatch Corporation
S.D.S. Lumber Company
Thompson River Veneer Products
Louisiana-Pacific Canada Ltd.
Bessemer Plywood Corporation
Eagle Veneer, Inc.

Total N.A. Plywood Production 9,710

U.S. OSB PRODUCERS

LP
West Fraser
Huber Engineered Woods
Georgia-Pacific Wood Products LLC
Weyerhaeuser
RoyOMartin
Langboard, Inc.

Total U.S. OSB Production 15,358

CANADA OSB PRODUCERS

West Fraser.
Louisiana-Pacific Canada Ltd.
Tolko Industries Ltd.
Weyerhaeuser
Georgia-Pacific Wood Products LLC
Arbec, Inc.
Forex Amos, Inc.
Huber Engineered Woods

Total Canada OSB Production 8,215

NORTH AMERICA OSB PRODUCERS

West Fraser
Louisiana-Pacific Canada Ltd.
Weyerhaeuser
Georgia-Pacific Wood Products LLC
Huber Engineered Woods
RoyOMartin
Tolko Industries Ltd.
Arbec, Inc.
Langboard, Inc.
Forex Amos, Inc.

Total N.A. OSB Production 23,573

Table 28

2022 NORTH AMERICA STRUCTURAL PANEL PRODUCERS
Ranked By Size
Million Sq. Ft. 3/8" Basis

West Fraser	
LP Corporation	
Georgia-Pacific Wood Products LLC	
Weyerhaeuser	
Huber Engineered Woods	
RoyOMartin	
Tolko Industries Ltd.	
Boise Cascade Company	
Roseburg Forest Products Company	
Arbec, Inc	
Langboard, Inc.	
Swanson Group	
Hunt Plywood Co., Inc.	
Richmond Plywood Corporation Ltd	
Winston Plywood and Veneer	
Scotch Plywood Co. of Alabama	
Hardel Mutual Plywood Corporation	
Murphy Plywood Company	
Forex Amos, Inc.	
Hood Industries, Inc.	
Emerald Forest Products	
Pacific Wood Laminates	
Canoe Forest Products	
Westlam Industries	
Southern Veneer Products	
Freres Lumber Company	
Aspen Planers Ltd.	
Timber Forest Products, Inc.	
Natron Wood Products	
Potlatch Corporation	
S.D.S. Lumber Company	
Thompson River Veneer Products	
Bessemer Plywood Corporation	
Eagle Veneer, Inc.	
Total North American Production	33,283

Table 29

NORTH AMERICA ⁸ STRUCTURAL PANEL PRODUCTION SUMMARY BY QUARTER BY REGION													
(Million Square Feet 3/8" Basis)													
	2018	2019	2020	2021					2022				
	Total	Total	Total	I	II	III	IV	Total	I	II	III	IV	Total
Sanded (1)													
West	300	247	272	75	59	58	62	254	60	73	48	44	225
Inland	43	41	27	8	7	5	7	27	6	8	6	5	25
South	658	650	658	128	91	126	154	499	111	110	108	99	428
TOTAL	1,001	937	957	211	157	189	223	780	177	191	162	148	678
Sturd-I-Floor (2)													
West	283	261	220	58	77	47	49	231	68	52	48	49	217
Inland	50	48	34	12	16	14	10	52	10	7	5	4	26
South	3,298	3,165	3,159	816	868	813	842	3,339	794	751	804	788	3,137
North	598	569	533	163	153	156	132	604	155	132	127	103	517
Total U.S.	4,229	4,042	3,946	1,049	1,114	1,030	1,033	4,226	1,027	942	984	944	3,897
Canada OSB	1,808	1,729	1,589	421	466	419	425	1,731	462	453	364	442	1,721
TOTAL	6,037	5,772	5,535	1,470	1,580	1,449	1,458	5,957	1,489	1,395	1,348	1,386	5,618
Sheathing (3)													
West	1,476	1,490	1,484	420	427	363	403	1,613	392	374	384	344	1,494
Inland	508	508	490	101	111	102	106	420	107	114	117	97	435
South	12,543	12,711	12,807	3,033	3,297	3,196	3,047	12,573	3,124	3,191	3,221	2,997	12,533
North	1,154	1,185	1,104	316	299	266	265	1,146	263	260	282	242	1,047
Total U.S.	15,681	15,893	15,885	3,870	4,134	3,927	3,821	15,752	3,886	3,939	4,004	3,680	15,509
Canada OSB	5,006	4,566	4,203	1,113	1,041	1,130	1,159	4,443	1,155	1,159	1,120	1,154	4,588
TOTAL	20,687	20,459	20,088	4,983	5,175	5,057	4,980	20,195	5,041	5,098	5,124	4,834	20,097
Siding (4)													
West	211	178	203	50	53	32	37	172	41	39	39	34	153
Inland	0	0	1	0	0	0	0	0	0	0	0	0	0
South	353	298	369	86	89	80	81	336	84	96	84	73	337
North	773	776	960	262	253	256	247	1,018	272	295	308	306	1,181
Total U.S.	1,337	1,252	1,533	398	395	368	365	1,526	397	430	431	413	1,671
Canada OSB													
TOTAL	1,337	1,252	1,533	398	395	368	365	1,526	397	430	431	413	1,671
Other (5)													
West	317	302	234	59	61	65	49	234	66	63	63	52	244
Inland	175	146	89	27	26	22	23	98	32	33	26	21	112
South	1,085	1,145	1,077	310	320	285	317	1,232	305	310	222	193	1,030
North	173	193	99	29	31	34	32	126	35	36	30	14	115
Total U.S.	1,750	1,786	1,499	425	438	406	421	1,690	438	442	341	280	1,501
Canada OSB	1,581	1,336	1,699	478	524	534	472	2,008	514	540	473	379	1,906
TOTAL	3,331	3,121	3,198	903	962	940	893	3,698	952	982	814	659	3,407
TOTAL CANADA PLYWOOD													
Plywood (6)(7)	1,969	1,922	1,890	515	544	423	437	1,919	462	467	448	435	1,812
TOTAL NORTH AMERICA STRUCTURAL PANEL PRODUCTION													
West	2,587	2,477	2,413	662	677	565	600	2,504	627	601	582	523	2,333
Inland	776	742	641	148	160	143	146	597	155	162	154	127	598
South	17,937	17,969	18,070	4,373	4,665	4,500	4,441	17,979	4,418	4,458	4,439	4,150	17,465
North	2,698	2,722	2,696	770	736	712	676	2,894	725	723	747	665	2,860
Total U.S.	23,998	23,910	23,820	5,953	6,238	5,920	5,863	23,974	5,925	5,944	5,922	5,465	23,256
Total Canada	10,364	9,553	9,381	2,527	2,575	2,506	2,493	10,101	2,593	2,619	2,405	2,410	10,027
TOTAL	34,362	33,463	33,201	8,480	8,813	8,426	8,356	34,075	8,518	8,563	8,327	7,875	33,283

(1) Includes fully sanded such as AC, BC, BB Plyform, etc.

(2) Includes all rated products intended for structural floor applications

(3) Includes all rated sheathing products

(4) Includes all panels stamped for exterior siding

(5) Includes specialties like web stock, rimboards, furniture frame stock, overlays, as well as specialties not used for construction purposes

(6) Statistics Canada

(7) Most recent quarter estimated.

(8) U.S. and Canada

Table 30

NORTH AMERICA⁵ OSB PRODUCTION BY QUARTER BY REGION
(Million Square Feet 3/8" Basis)

	2018	2019	2020	2021					2022				
	Total	Total	Total	I	II	III	IV	Total	I	II	III	IV	Total
OSB													
<i>Sturd-I-Floor (1)</i>													
South	3,002	2,896	2,923	756	750	722	783	3,011	719	697	750	738	2,904
North	598	569	533	163	153	156	132	604	155	132	127	103	517
Total U.S.	3,600	3,465	3,456	919	903	878	915	3,615	874	829	877	841	3,421
Canada	1,808	1,729	1,589	421	466	419	425	1,731	462	453	364	442	1,721
TOTAL	5,408	5,194	5,045	1,340	1,369	1,297	1,340	5,346	1,336	1,282	1,241	1,283	5,142
<i>Sheathing (2)</i>													
South	8,741	8,950	9,109	2,120	2,310	2,300	2,181	8,911	2,174	2,252	2,309	2,117	8,852
North	1,154	1,185	1,104	316	299	266	265	1,146	263	260	282	242	1,047
Total U.S.	9,895	10,135	10,213	2,436	2,609	2,566	2,446	10,057	2,437	2,512	2,591	2,359	9,899
Canada	5,006	4,566	4,203	1,113	1,041	1,130	1,159	4,443	1,155	1,159	1,120	1,154	4,588
TOTAL	14,901	14,701	14,416	3,549	3,650	3,696	3,605	14,500	3,592	3,671	3,711	3,513	14,487
<i>Siding (3)</i>													
South													
North	773	776	960	262	253	256	247	1,018	272	295	308	306	1,181
Total U.S.	773	776	960	262	253	256	247	1,018	272	295	308	306	1,181
Canada													
TOTAL	773	776	960	262	253	256	247	1,018	272	295	308	306	1,181
<i>Other (4)</i>													
South	688	786	767	196	222	196	207	821	223	239	150	130	742
North	173	193	99	29	31	34	32	126	35	36	30	14	115
Total U.S.	861	978	866	225	253	230	239	947	258	275	180	144	857
Canada	1,581	1,336	1,699	478	524	534	472	2,008	514	540	473	379	1,906
TOTAL	2,442	2,314	2,565	703	777	764	711	2,955	772	815	653	523	2,763
TOTAL NORTH AMERICA OSB													
South	12,431	12,632	12,799	3,072	3,282	3,218	3,171	12,743	3,116	3,188	3,209	2,985	12,498
North	2,698	2,722	2,696	770	736	712	676	2,894	725	723	747	665	2,860
Total U.S.	15,129	15,354	15,495	3,842	4,018	3,930	3,847	15,637	3,841	3,911	3,956	3,650	15,358
Canada	8,395	7,631	7,491	2,012	2,031	2,083	2,056	8,182	2,131	2,152	1,957	1,975	8,215
TOTAL	23,524	22,985	22,986	5,854	6,049	6,013	5,903	23,819	5,972	6,063	5,913	5,625	23,573

(1) Includes all rated products intended for structural floor applications

(2) Includes all rated sheathing products

(3) Includes all panels stamped for exterior siding

(4) Includes specialties like web stock, rimboards, furniture frame stock, overlays, as well as specialties not used for construction purposes

(5) U.S. and Canada

Table 31

NORTH AMERICA⁷ PLYWOOD PRODUCTION BY QUARTER BY REGION

U.S. Plywood Sanded (1)	2018	2019	2020	(Million Square Feet 3/8" Basis)					2022				
	Total	Total	Total	2021									
				I	II	III	IV	Total	I	II	III	IV	Total
West	300	247	272	75	59	58	62	254	60	73	48	44	225
Inland	43	41	27	8	7	5	7	27	6	8	6	5	25
South	658	650	658	128	91	126	154	499	111	110	108	99	428
TOTAL	1,001	938	957	211	157	189	223	780	177	191	162	148	678
Sturd-I-Floor (2)													
West	283	261	220	58	77	47	49	231	68	52	48	49	217
Inland	50	48	34	12	16	14	10	52	10	7	5	4	26
South	296	269	236	60	118	91	59	328	75	54	54	50	233
TOTAL	629	578	490	130	211	152	118	611	153	113	107	103	476
Sheathing (3)													
West	1,476	1,490	1,484	420	427	363	403	1,613	392	374	384	344	1,494
Inland	508	508	490	101	111	102	106	420	107	114	117	97	435
South	3,802	3,760	3,698	913	987	896	866	3,662	950	939	912	880	3,681
TOTAL	5,786	5,758	5,672	1,434	1,525	1,361	1,375	5,695	1,449	1,427	1,413	1,321	5,610
Siding (4)													
West	211	178	203	50	53	32	37	172	41	39	39	34	153
Inland	0	0	0	0	0	0	0	0	0	0	0	0	0
South	353	298	369	86	89	80	81	336	84	96	84	73	337
TOTAL	564	476	573	136	142	112	118	508	125	135	123	107	490
Other (5)													
West	317	302	234	59	61	65	49	234	66	63	63	52	244
Inland	175	146	89	27	26	22	23	98	32	33	26	21	112
South	397	360	310	114	98	89	110	411	82	71	72	63	288
TOTAL	889	808	633	200	185	176	182	743	180	167	161	136	644
TOTAL U.S. PLYWOOD													
West	2,587	2,477	2,413	662	677	565	600	2,504	627	601	582	523	2,333
Inland	776	743	641	148	160	143	146	597	155	162	154	127	598
South	5,506	5,337	5,271	1,301	1,383	1,282	1,270	5,236	1,302	1,270	1,230	1,165	4,967
TOTAL	8,869	8,557	8,325	2,111	2,220	1,990	2,016	8,337	2,084	2,033	1,966	1,815	7,898
TOTAL CANADA PLYWOOD													
Plywood (6)	1,969	1,922	1,890	515	544	423	437	1,919	462	467	448	435	1,812
TOTAL NORTH AMERICA PLYWOOD													
TOTAL	10,838	10,479	10,215	2,626	2,764	2,413	2,453	10,256	2,546	2,500	2,414	2,250	9,710

(1) Includes fully sanded such as AC, BC, BB Plyform, etc.

(2) Includes all rated products intended for structural floor applications

(3) Includes all rated sheathing products

(4) Includes all panels stamped for exterior siding

(5) Includes specialties like web stock, rimboards, furniture frame stock, overlays, as well as specialties not used for construction purposes

(6) Most recent quarter estimated

(7) U.S. and Canada

Table 32

NUMBER OF NORTH AMERICA STRUCTURAL PANEL MANUFACTURING PLANTS

	Total	U.S. Plywood					U.S. OSB			
	U.S.	Total	West	Inland	South	North	Total	Inland	South	North
2000	127	89	30	10	47	2	38	1	24	13
2001	119	79	26	8	43	2	40	1	26	13
2002	116	77	25	7	43	2	39	0	26	13
2003	112	73	23	8	40	2	39	0	26	13
2004	113	73	23	8	40	2	40	0	27	13
2005	111	71	22	8	39	2	40	0	28	12
2006	109	68	22	6	38	2	41	0	29	12
2007	108	67	23	6	36	2	41	0	29	12
2008	105	65	22	6	35	2	40	0	29	11
2009	98	60	21	6	32	1	38	0	29	9
2010	96	60	21	6	32	1	36	0	27	9
2011	89	53	20	6	26	1	36	0	27	9
2012	89	53	20	6	26	1	36	0	27	9
2013	91	54	20	6	27	1	37	0	28	9
2014	90	53	19	6	27	1	37	0	28	9
2015	90	53	19	6	27	1	37	0	28	9
2016	87	50	17	4	28	1	37	0	28	9
2017	85	48	15	4	28	1	37	0	28	9
2018	84	46	14	4	27	1	38	0	29	9
2019	85	47	14	4	28	1	38	0	29	9
2020	85	47	14	4	28	1	38	0	29	9
2021	85	47	14	4	28	1	38	0	29	9
2022	85	47	14	4	28	1	38	0	29	9

	Total Canada	Plywood	OSB
2000	37	13	24
2001	37	13	24
2002	36	13	23
2003	37	13	24
2004	37	13	24
2005	40	15	25
2006	40	15	25
2007	36	14	22
2008	33	13	20
2009	33	13	20
2010	33	13	20
2011	30	11	19
2012	31	11	20
2013	31	11	20
2014	31	11	20
2015	31	11	20
2016	31	11	20
2017	31	11	20
2018	31	11	20
2019	31	11	20
2020	30	11	19
2021	30	11	19
2022	30	11	19

	Total N.A.	Plywood	OSB
2000	164	102	62
2001	156	92	64
2002	152	90	62
2003	149	86	63
2004	150	86	64
2005	151	86	65
2006	149	83	66
2007	144	81	63
2008	138	78	60
2009	131	73	58
2010	129	73	56
2011	119	64	55
2012	120	64	56
2013	122	65	57
2014	121	64	57
2015	121	64	57
2016	118	61	57
2017	116	59	57
2018	115	57	58
2019	116	58	58
2020	115	58	57
2021	115	58	57
2022	115	58	57

Table 33

**SANDED SHARE OF U.S. PLYWOOD
2000–2022**

Million Sq. Ft. 3/8" Basis

	West			Inland			South*			Total		
	Plywood	%		Plywood	%		Plywood	%		Total	Total	%
	Production	Sanded	Sanded	Production	Sanded	Sanded	Production	Sanded	Sanded	Production	Sanded	Sanded
2000	3,967	675	17%	1,635	247	15%	11,873	1,625	14%	17,475	2,547	15%
2001	3,538	613	17%	1,415	245	17%	10,169	1,402	14%	15,122	2,260	15%
2002	3,482	607	17%	1,378	270	20%	10,340	1,471	14%	15,200	2,348	15%
2003	3,413	718	21%	1,340	208	16%	9,953	1,460	15%	14,706	2,386	16%
2004	3,441	478	14%	1,341	158	12%	9,883	1,120	11%	14,665	1,756	12%
2005	3,376	429	13%	1,290	145	11%	9,664	1,194	12%	14,330	1,768	12%
2006	3,029	405	13%	1,094	127	12%	9,305	1,069	11%	13,428	1,601	12%
2007	2,735	323	12%	1,001	123	13%	8,507	1,112	13%	12,243	1,568	13%
2008	2,551	291	11%	888	115	13%	6,798	770	11%	10,237	1,176	11%
2009	2,059	222	11%	732	68	9%	5,817	631	11%	8,608	921	11%
2010	2,562	235	9%	835	82	10%	5,734	676	12%	9,131	993	11%
2011	2,326	304	13%	842	77	9%	5,812	686	12%	8,980	1,067	12%
2012	2,789	292	10%	875	69	8%	5,517	702	13%	9,181	1,063	12%
2013	3,009	290	10%	831	54	6%	5,506	653	12%	9,346	997	11%
2014	2,855	341	12%	823	50	6%	5,307	624	12%	8,985	1,015	11%
2015	2,783	292	10%	841	50	6%	5,127	608	12%	8,751	950	11%
2016	2,678	318	12%	829	55	7%	5,302	640	12%	8,809	1,013	12%
2017	2,627	324	12%	775	42	5%	5,624	727	13%	9,026	1,093	12%
2018	2,587	300	9%	776	43	5%	5,508	658	12%	8,869	1,001	11%
2019	2,477	247	10%	743	41	6%	5,337	650	12%	8,557	938	11%
2020	2,413	272	11%	641	27	4%	5,271	658	12%	8,325	957	11%
2021	2,504	254	10%	597	27	4%	5,236	499	9%	8,337	780	9%
2022	2,504	254	10%	597	27	4%	5,236	499	9%	8,337	780	9%

Table 34

NORTH AMERICA STRUCTURAL PANEL PRODUCTION
1933–2022
 Million Square Ft., 3/8" Basis

<u>Year</u>	<u>U.S.</u>			<u>Canada</u>			<u>Total North America</u>		
	<u>Plywood</u>	<u>OSB</u>	<u>Total</u>	<u>Plywood</u>	<u>OSB</u>	<u>Total</u>	<u>Plywood</u>	<u>OSB</u>	<u>Total</u>
1933	390	0	390			0	390	0	390
1934	384	0	384			0	384	0	384
1935	491	0	491			0	491	0	491
1936	700	0	700			0	700	0	700
1937	725	0	725			0	725	0	725
1938	650	0	650			0	650	0	650
1939	950	0	950			0	950	0	950
1940	1,200	0	1,200	128		128	1,328	0	1,328
1941	1,620	0	1,620	151		151	1,771	0	1,771
1942	1,782	0	1,782	160		160	1,942	0	1,942
1943	1,430	0	1,430	170		170	1,600	0	1,600
1944	1,440	0	1,440	190		190	1,630	0	1,630
1945	1,200	0	1,200	217		217	1,417	0	1,417
1946	1,395	0	1,395	205		205	1,600	0	1,600
1947	1,630	0	1,630	230		230	1,860	0	1,860
1948	1,871	0	1,871	296		296	2,167	0	2,167
1949	1,899	0	1,899	270		270	2,169	0	2,169
1950	2,554	0	2,554	292		292	2,846	0	2,846
1951	2,867	0	2,867	362		362	3,229	0	3,229
1952	3,050	0	3,050	377		377	3,427	0	3,427
1953	3,670	0	3,670	506		506	4,176	0	4,176
1954	3,904	0	3,904	562		562	4,466	0	4,466
1955	5,075	0	5,075	696		696	5,771	0	5,771
1956	5,240	0	5,240	811		811	6,051	0	6,051
1957	5,460	0	5,460	818		818	6,278	0	6,278
1958	6,340	0	6,340	888		888	7,228	0	7,228
1959	7,828	0	7,828	875		875	8,703	0	8,703
1960	7,816	0	7,816	1,010		1,010	8,826	0	8,826
1961	8,577	0	8,577	1,137		1,137	9,714	0	9,714
1962	9,513	0	9,513	1,233		1,233	10,746	0	10,746
1963	10,216	0	10,216	1,428		1,428	11,644	0	11,644
1964	11,679	0	11,679	1,626		1,626	13,305	0	13,305
1965	12,447	0	12,447	1,674		1,674	14,121	0	14,121
1966	13,056	0	13,056	1,700		1,700	14,756	0	14,756
1967	12,958	0	12,958	1,713		1,713	14,671	0	14,671
1968	14,695	0	14,695	1,852		1,852	16,547	0	16,547
1969	13,694	0	13,694	1,858		1,858	15,552	0	15,552
1970	14,340	0	14,340	1,731		1,731	16,071	0	16,071
1971	16,635	0	16,635	1,888		1,888	18,523	0	18,523
1972	18,324	0	18,324	2,006		2,006	20,330	0	20,330
1973	18,305	0	18,305	2,203		2,203	20,508	0	20,508
1974	15,878	0	15,878	1,768		1,768	17,646	0	17,646
1975	16,050	0	16,050	1,744		1,744	17,794	0	17,794
1976	18,440	0	18,440	2,144		2,144	20,584	0	20,584
1977	19,376	0	19,376	2,343		2,343	21,719	0	21,719
1978	19,964	0	19,964	2,510		2,510	22,474	0	22,474
1979	19,653	0	19,653	2,307		2,307	21,960	0	21,960
1980	16,333	135	16,468	2,212	616	2,828	18,545	751	19,296
1981	16,752	271	17,023	2,357	783	3,140	19,109	1,054	20,163

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Table 34 – Continued

**NORTH AMERICA STRUCTURAL PANEL PRODUCTION
1933–2022**

Million Square Ft., 3/8" Basis

<u>Year</u>	<u>U.S.</u>			<u>Canada</u>			<u>Total North America</u>		
	<u>Plywood</u>	<u>OSB</u>	<u>Total</u>	<u>Plywood</u>	<u>OSB</u>	<u>Total</u>	<u>Plywood</u>	<u>OSB</u>	<u>Total</u>
1982	15,846	557	16,403	1,900	606	2,506	17,746	1,163	18,909
1983	19,480	1,341	20,821	2,331	961	3,292	21,811	2,302	24,113
1984	19,926	2,042	21,968	2,087	1,345	3,432	22,013	3,387	25,400
1985	20,169	2,669	22,838	2,212	1,511	3,723	22,381	4,180	26,561
1986	22,118	3,513	25,631	2,120	1,532	3,652	24,238	5,045	29,283
1987	22,899	4,076	26,975	2,519	1,796	4,315	25,418	5,872	31,290
1988	22,599	4,604	27,203	2,443	1,861	4,304	25,042	6,465	31,507
1989	21,385	5,105	26,490	2,442	2,448	4,890	23,827	7,553	31,380
1990	20,919	5,418	26,337	2,297	2,231	4,528	23,216	7,649	30,865
1991	18,652	5,613	24,265	1,928	1,803	3,731	20,580	7,416	27,996
1992	19,332	6,653	25,985	2,076	2,570	4,646	21,408	9,223	30,631
1993	19,315	7,002	26,317	2,077	3,078	5,155	21,392	10,080	31,472
1994	19,638	7,486	27,124	2,072	3,408	5,480	21,710	10,894	32,604
1995	19,367	7,903	27,270	2,069	3,759	5,828	21,436	11,662	33,098
1996	19,181	9,314	28,495	2,064	5,421	7,485	21,245	14,735	35,980
1997	17,963	10,534	28,497	2,066	6,392	8,458	20,029	16,926	36,955
1998	17,776	11,227	29,003	1,976	7,769	9,745	19,752	18,996	38,748
1999	17,816	11,612	29,428	2,179	8,606	10,785	19,995	20,218	40,213
2000	17,475	11,906	29,381	2,201	8,744	10,945	19,676	20,650	40,326
2001	15,121	12,532	27,653	2,291	8,998	11,289	17,412	21,530	38,942
2002	15,200	13,426	28,626	2,442	9,273	11,715	17,642	22,699	40,341
2003	14,706	13,615	28,321	2,493	10,040	12,533	17,199	23,655	40,854
2004	14,665	14,271	28,936	2,648	11,103	13,751	17,313	25,374	42,687
2005	14,330	14,985	29,315	2,625	11,168	13,793	16,955	26,153	43,108
2006	13,428	14,960	28,388	2,545	11,460	14,005	15,973	26,420	42,393
2007	12,243	14,763	27,006	2,335	9,170	11,505	14,578	23,933	38,511
2008	10,237	13,003	23,240	1,969	5,502	7,471	12,206	18,505	30,711
2009	8,608	9,598	18,206	1,602	4,484	6,086	10,210	14,082	24,292
2010	9,131	10,299	19,430	1,780	4,998	6,778	10,910	15,297	26,207
2011	8,980	10,039	19,019	1,794	5,266	7,060	10,774	15,305	26,079
2012	9,181	11,038	20,219	1,824	5,742	7,566	11,005	16,780	27,785
2013	9,346	12,492	21,838	1,792	6,268	8,060	11,138	18,760	29,898
2014	8,985	13,008	21,993	1,810	6,877	8,687	10,795	19,885	30,680
2015	8,751	13,284	22,035	1,929	7,074	9,003	10,680	20,357	31,037
2016	8,809	13,922	22,731	1,951	7,913	9,864	10,780	21,835	32,595
2017	9,026	14,609	23,635	1,994	8,083	10,077	11,020	22,692	33,712
2018	8,869	15,129	23,998	1,969	8,395	10,364	10,838	23,524	34,362
2019	8,557	15,354	23,910	1,922	7,631	9,553	10,479	22,985	33,463
2020	8,325	15,495	23,820	1,890	7,491	9,381	10,215	22,986	33,201
2021	8,337	15,637	23,974	1,919	8,182	10,101	10,256	23,819	34,075
2022	7,898	15,358	23,256	1,812	8,215	10,027	9,710	23,573	33,283

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Table 35

U.S. Structural Panel Production By State
 Million Sq. Ft. 3/8" Basis

	2017		2018		2019		2020		2021		2022	
	Volume	# Mills	Volume	# Mills	Volume	# Mills	Volume	# Mills	Volume	# Mills	Volume	# Mills
Oregon												
Plywood	2,518	15	2,475	14	2,395	14	2,291	15	2,357	15	2,189	15
OSB	-	-	-	-	-	-	-	-	-	-	-	-
Total	2,518	15	2,475	14	2,395	14	2,291	15	2,357	15	2,189	15
Texas												
Plywood	695	2	670	2	654	2	679	2	680	2	670	2
OSB	1,740	4	2,030	5	2,407	5	2,529	5	2,504	5	2,550	5
Total	2,435	6	2,700	7	3,061	7	3,208	7	3,184	7	3,220	7
Louisiana												
Plywood	1,250	5	1,258	5	1,274	5	1,186	5	1,213	5	1,200	5
OSB	1,173	2	1,155	2	1,145	2	1,129	2	1,062	2	1,110	2
Total	2,423	7	2,413	7	2,419	7	2,315	7	2,275	7	2,310	7
Georgia												
Plywood	601	3	574	2	377	2	381	2	348	2	338	2
OSB	1,786	3	1,819	3	1,700	3	1,424	3	1,606	3	1,593	3
Total	2,387	6	2,393	5	2,077	5	1,805	5	1,954	5	1,931	5
South Carolina												
Plywood	405	3	387	3	380	3	402	3	420	3	363	3
OSB	1,581	3	1,555	3	1,421	3	1,295	3	1,276	3	1,250	3
Total	1,986	6	1,942	6	1,801	6	1,697	6	1,696	6	1,613	6
Mississippi												
Plywood	818	4	818	4	834	4	734	4	782	4	710	4
OSB	-	2	-	2	-	2	-	2	-	2	-	2
Total	818	6	818	6	834	6	734	6	782	6	710	6
Virginia												
Plywood	-	1	-	1	-	1	-	1	-	1	-	1
OSB	962	3	908	3	845	3	919	3	946	3	851	3
Total	962	4	908	4	845	4	919	4	946	4	851	4
Arkansas												
Plywood	501	2	505	2	475	2	518	2	412	2	416	2
OSB	-	1	-	1	-	1	-	1	-	1	-	1
Total	501	3	505	3	475	3	518	3	412	3	416	3
Michigan												
Plywood	-	1	-	1	-	1	-	1	-	1	-	1
OSB	1,095	3	971	3	1,096	3	1,098	3	1,100	3	1,060	3
Total	1,095	4	971	4	1,096	4	1,098	4	1,100	4	1,060	4
Washington												
Plywood	604	3	610	3	575	3	589	3	547	3	550	3
OSB	-	-	-	-	-	-	-	-	-	-	-	-
Total	604	3	610	3	575	3	589	3	547	3	550	3
North Carolina												
Plywood	328	3	283	3	367	4	360	3	340	3	312	3
OSB	932	2	965	2	913	2	933	2	800	2	788	2
Total	1,260	5	1,248	5	1,280	6	1,293	5	1,140	5	1,100	5
Alabama												
Plywood	439	2	435	2	425	2	436	2	447	2	422	2
OSB	1,084	3	1,399	3	1,431	3	1,524	3	1,442	3	1,286	3
Total	1,523	5	1,834	5	1,856	5	1,960	5	1,889	5	1,708	5
Minnesota												
Plywood	-	-	-	-	-	-	-	-	-	-	-	-
OSB	734	2	741	2	706	2	691	2	730	2	755	2
Total	734	2	741	2	706	2	691	2	730	2	755	2
Florida												
Plywood	-	2	-	2	-	2	-	2	-	2	-	2
OSB	-	1	-	1	-	1	-	1	-	1	-	1
Total	-	3	-	3	-	3	-	3	-	3	-	3

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Table 35 Continued

U.S. Structural Panel Production By State
 Million Sq. Ft. 3/8" Basis

	2017		2018		2019		2020		2021		2022	
	Volume	# Mills	Volume	# Mills	Volume	# Mills	Volume	# Mills	Volume	# Mills	Volume	# Mills
Wisconsin	-	-	-	-	-	-	-	-	-	-	-	-
Plywood	-	-	-	-	-	-	-	-	-	-	-	-
OSB	658	2	618	2	600	2	616	2	661	2	691	2
Total	658	2	618	2	600	2	616	2	661	2	691	2
West Virginia	-	-	-	-	-	-	-	-	-	-	-	-
Plywood	-	-	-	-	-	-	-	-	-	-	-	-
OSB	670	2	622	2	651	2	677	2	675	2	673	2
Total	670	2	622	2	651	2	677	2	675	2	673	2
Montana	-	-	-	-	-	-	-	-	-	-	-	-
Plywood	-	1	-	1	-	1	-	1	-	1	-	1
OSB	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	1	-	1	-	1	-	1	-	1	-	1
Idaho	-	-	-	-	-	-	-	-	-	-	-	-
Plywood	-	1	-	1	-	1	-	1	-	1	-	1
OSB	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	1	-	1	-	1	-	1	-	1	-	1
Maine	-	-	-	-	-	-	-	-	-	-	-	-
Plywood	-	-	-	-	-	-	-	-	-	-	-	-
OSB	370	2	368	2	319	2	293	2	403	2	354	2
Total	370	2	368	2	319	2	293	2	403	2	354	2
New York	-	-	-	-	-	-	-	-	-	-	-	-
Plywood	-	-	-	-	-	-	-	-	-	-	-	-
OSB	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-
Oklahoma	-	-	-	-	-	-	-	-	-	-	-	-
Plywood	-	-	-	-	-	-	-	-	-	-	-	-
OSB	-	1	-	1	-	1	-	1	-	1	-	1
Total	-	1	-	1	-	1	-	1	-	1	-	1
Tennessee	-	-	-	-	-	-	-	-	-	-	-	-
Plywood	-	-	-	-	-	-	-	-	-	-	-	-
OSB	-	1	-	1	-	1	-	1	-	1	-	1
Total	-	1	-	1	-	1	-	1	-	1	-	1
States Combined with one producing mill to avoid disclosure	-	-	-	-	-	-	-	-	-	-	-	-
Plywood	867	-	854	-	800	-	749	-	791	-	728	-
OSB	1,824	-	1,978	-	2,120	-	2,367	-	2,432	-	2,397	-
Total	2,691	-	2,832	-	2,920	-	3,116	-	3,223	-	3,125	-

	2017		2018		2019		2020		2021		2022	
	Volume	# Mills	Volume	# Mills	Volume	# Mills	Volume	# Mills	Volume	# Mills	Volume	# Mills
Grand Total												
Plywood	9,026	48	8,869	46	8,556	47	8,325	47	8,337	47	7,898	47
OSB	14,609	37	15,129	38	15,354	38	15,495	38	15,637	38	15,358	38
Total	23,635	85	23,998	84	23,910	85	23,820	85	23,974	85	23,256	85

* States with one producing mill are combined to avoid disclosure.

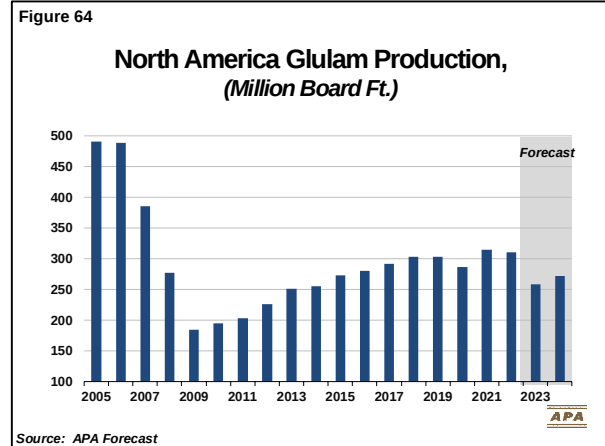
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Engineered Wood Demand and Production Glulam

After starting out 2022 on a robust note with production totaling 162 million board feet, demand for North America produced glulam fell over the course of the second half of the year. Production in the second half totaled 145 million board feet. Fourth quarter production was 71 million board feet, down almost 8% from the fourth quarter of 2021.

North America glulam production is forecast to fall from 310 million board feet in 2022 to 259 million board feet in 2023. (See Figure 64.) The decline is essentially driven by the fall in single-family starts. Production in 2024 gets a slight boost based on single-family starts in the U.S. rising to 825,000 from 785,000 in 2023.



The detailed historical data and forecasts of glulam demand and production are provided in Table 36.

Table 36

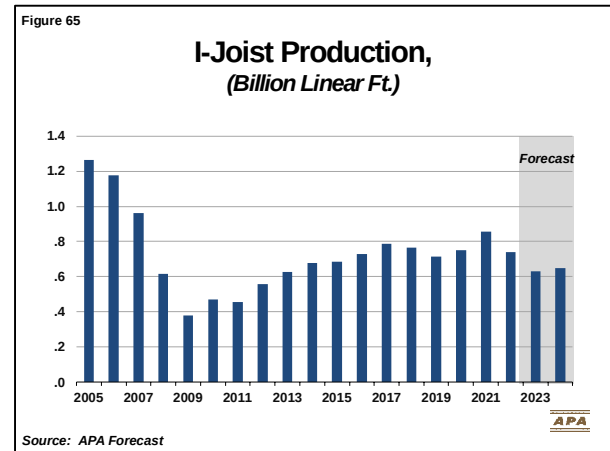
GLULAM DEMAND AND PRODUCTION										
	(Million Bd. Ft.)									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
<u>UNITED STATES</u>										
Domestic Markets										
Residential	143	150	161	168	171	167	200	195	150	160
Nonresidential	94	97	100	102	101	95	87	84	81	83
Industrial/Other	14	16	14	14	11	10	11	10	10	11
Total Domestic Demand	251	263	275	284	283	272	298	289	241	254
Net export/Inventory change	3	-3	-4	-3	-3	-3	-3	-3	-3	-3
U.S. PRODUCTION	252	257	271	281	280	264	291	284	238	251
<u>CANADA</u>										
CANADA PRODUCTION	21	23	20	23	23	23	24	26.4	21	21
TOTAL PRODUCTION	273	280	292	304	303	287	315	310	259	272
Change	7%	3%	4%	4%	0%	-6%	10%	-2%	-16%	5%

I-Joists

North America I-joist production totaled 424 million linear feet in the first half of 2022, down 2.1% from the first half of 2021. Production in the third quarter totaled 190 million linear feet and then plunged to 127 million linear feet in the fourth quarter. Compared to the fourth quarter of 2021, I-joist output in the fourth quarter was down 38%. This is a much bigger decline than what might have been expected based on single-family starts being down 28% from the fourth quarter of 2021.

The decline in residential construction in the U.S. and Canada projected for 2023 will lead to I-joist production in North America falling to 629 million linear feet in 2023. (See Figure 65.) This will mark the lowest production level since 2013. Production should improve in 2024, but the increase is modest. Fewer multifamily starts in

2024 versus 2023 will be a partial offset to the increase in demand generated by single-family starts rising to 825,000 in 2024.



The detailed historical and forecast data for I-joist demand and production are provided in Table 37.

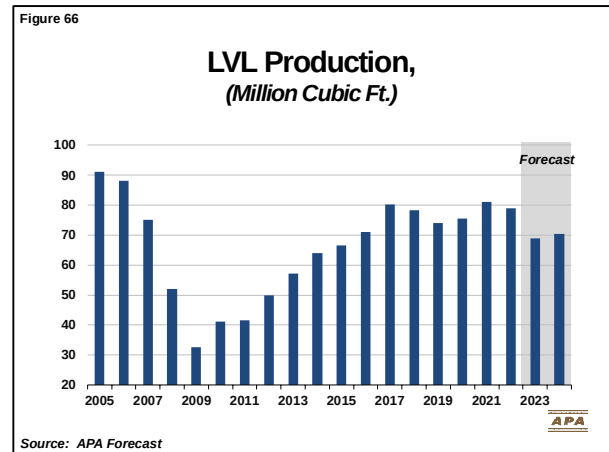
Table 37

WOOD I-JOISTS DEMAND AND PRODUCTION										
(Million Linear Ft.)										
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
UNITED STATES										
Domestic Markets										
New Residential	500	523	546	554	553	587	672	582	454	470
Repair & Remodeling	36	37	39	39	39	40	41	40	38	38
Nonresidential & Other	36	38	42	42	40	37	33	28	28	30
Total Domestic Demand	572	598	627	635	632	664	746	650	520	538
CANADA										
New Residential	84	87	101	94	86	90	97	91	88	88
Repair & Remodeling	5	5	5	5	5	5	5	5	5	5
Nonresidential & Other	11	11	11	10	9	9	9	9	9	9
Total Domestic Demand	100	103	117	109	100	104	111	105	102	102
All Exports	13	14	14	12	9	8	7	7	7	7
Inventory Change/Other	4	4	30	10	(27)	(24)	(6)	(21)		
Total Demand/Production	687	730	788	766	714	752	857	741	629	647
U.S. PRODUCTION	465	482	518	514	464	489	565	471	419	430
CANADA PRODUCTION	223	248	270	252	250	263	292	270	210	217
TOTAL PRODUCTION	687	730	788	766	714	752	857	741	629	647
Change	1%	6%	8%	-3%	-7%	5%	14%	-14%	-15%	3%

LVL

LVL production followed the same pattern of glulam and I-joists, rapid decline in the second half of 2022. First half 2022 production in North America totaled 41.2 million cubic feet, unchanged from that of the first half of 2021. Production held up well in the third quarter at 21.4 million cubic feet, but then fell 24% to 16.2 million cubic feet in the fourth quarter.

LVL production is projected to fall to 68.9 million cubic feet in 2023 and then a modest increase to 70.4 million cubic feet in 2024. As shown in Figure 66, LVL production has not been less than 70 million cubic feet since 2015.



The detailed historical and forecast data for LVL demand and production are provided in Table 38.

Table 38

LVL DEMAND AND PRODUCTION (Million Cubic Ft.)										
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
I-Joist Flanges	19.9	20.6	22.1	22.0	19.8	20.9	23.6	19.6	17.9	18.4
Beams, Headers & Other	46.6	50.4	58.1	56.3	54.1	54.5	57.5	57.0	51.0	52.0
Total Demand/Production	66.5	71.0	80.2	78.3	73.9	75.4	81.1	76.6	68.9	70.4
U.S. PRODUCTION	61.4	65.0	72.7	71.3	67.4	69.0	73.9	71.7	62.9	64.4
CANADA PRODUCTION	5.1	6.0	7.5	7.0	6.5	6.4	7.2	7.1	6.0	6.0
TOTAL PRODUCTION	66.5	71.0	80.2	78.3	73.9	75.4	81.1	78.8	68.9	70.4
Change	4%	7%	13%	-2%	-6%	2%	8%	-3%	-13%	2%

Table 39

ENGINEERED WOOD PRODUCTION IN NORTH AMERICA

1980–2022

	Glulam (Million Board Ft.)			I-Joist (Million Linear Ft.)			LVL (Million Cubic Ft.)		
	Canada	US	Total	Canada	US	Total	Canada	US	Total
1980			214			50			3
1981			199			50			4
1982			172			60			4
1983			201			70			5
1984			240			80			5
1985			258			100			7
1986			346			110			8
1987			292			120			9
1988			312			120			11
1989			337			130			12
1990			339			135			16
1991			277			175			16
1992			270			280			17
1993			250			398			21
1994			276			422			23
1995	13	282	295	39	358	397			28
1996	13	309	322	54	444	498			32
1997	15	300	315	80	547	627			38
1998	13	287	300	92	619	702	2	41	43
1999	15	316	331	162	733	895	4	48	52
2000	21	356	377	173	693	866	4	48	52
2001	25	335	360	179	747	926	6	53	59
2002	17	321	338	225	756	981	6	56	62
2003	20	323	343	276	798	1,074	6	62	68
2004	26	376	402	402	880	1,282	8	78	86
2005	27	464	491	416	847	1,263	8	83	91
2006	27	461	488	372	804	1,176	8	80	88
2007	27	358	385	304	656	960	7	68	75
2008	21	256	277	191	424	615	5	47	52
2009	18	167	185	123	257	380	3	30	33
2010	20	175	195	172	299	471	4	37	41
2011	19	184	203	164	293	457	4	38	42
2012	22	204	226	197	359	556	4	46	50
2013	22	230	251	204	422	626	4	53	57
2014	22	233	255	215	457	672	4	60	64
2015	21	252	273	222	465	687	5	61	66
2016	23	257	280	248	482	730	6	65	70
2017	20	271	291	270	518	788	7	73	80
2018	23	281	304	252	514	766	7	71	78
2019	23	280	303	250	464	714	7	67	74
2020	23	264	287	263	489	752	6	69	75
2021	24	291	315	292	565	857	7	74	81
2022	26	284	310	270	471	742	7	72	79

Note: Prior to 1994 data are estimates from various articles and reports. APA began mill surveys and estimates in 1994. LVL revised 1991–1996. Canada production combined with U.S. prior to 1995 for Glulam and I-joists and prior to 1998 for LVL to avoid disclosure.

Table 40

ENGINEERED WOOD MANUFACTURERS IN NORTH AMERICA

March 2023

Company	City	State	Country	Glulam	CLT	I-joist	Structural Composite Lbr		
							LVL	PSL	LSL
AcuTruss Industries	Vernon	BC	CAN			X			
Alamco Wood Products, Inc.	Albert Lea	MN	US	X					
American Laminators, Inc.	Swishhome	OR	US	X					
Arizona Structural Laminators	Eagar	AZ	US	X					
Art Massif Structure de Bois	St Jean-Port-Joli	QC	CAN	X					
Boise Cascade LLC	St. Jacques	NB	CAN			X			
Boise Cascade LLC	Emmett	ID	US	X					
Boise Cascade LLC	Lena	LA	US			X	X		
Boise Cascade LLC	White City	OR	US			X	X		
Boise Cascade LLC	Homedale	ID	US	X					
Boise Cascade LLC	Thorsby	AL	US			X	X		
Boozer Laminated Beam Co., Inc.	Anniston	AL	US	X					
Canfor Southern Pine	El Dorado	AR	US	X					
Canfor Southern Pine	Washington	GA	US	X					
CLT USA	Asheville	NC	US		X				
CST Innovations	New Westminster	BC	CAN		X				
D.R. Johnson Wood Innovations	Riddle	OR	US	X	X				
Duco Lam	Drain	OR	US	X					
Eacom Timber Corporation.	Sault Ste. Marie	ON	CAN			X			
Element5 Limited Partnership	St. Thomas	ON	CAN	X	X				
Enwood Structures, Inc.	Morrisville	NC	US	X					
Freres Lumber Co., Inc.	Lyons	OR	US		X				
Fraser Wood Industries Ltd.	Squamish	BC	CAN	X					
G-L Technology	Magna	UT	US	X					
Global LVL	Ville-Marie	QC	CAN				X		
Goodlam	Montreal	QC	CAN	X					
Gruen-Wald Engineered Laminates	Sioux Falls	SD	US	X					
IB XLAM USA LLC	Dothan	AL	US	X	X				
IB EWP Inc.	Pohenegamook	QC	CAN			X			
Kalesnikoff Lumber	South Slokan	BC	CAN	X	X				
Laminated Timbers, Inc.	London	KY	US	X					
Leaf Engineered Wood Products	Devlin	ON	CAN	X	X				
Mississippi Laminators, Inc	Shubuta	MS	US	X					
Murphy Engineered Wood	Sutherlin	OR	US				X		
NASCOR, Inc. AcuJoist Mfg Corp.	Vernon	BC	CAN			X			
Nordic Structures	Chibougamau	QC	CAN	X	X	X			
Pacific Wood Laminates	Brookings	OR	US				X		
Pacific Woodtech Corporation	Burlington	WA	US			X	X		
Pacific Woodtech Corporation	Golden	BC	CAN				X		
Pacific Woodtech Corporation	Red Bluff	CA	US			X			
Pacific Woodtech Corporation	Wilmington	NC	US				X		
Pinkwood Ltd.	Calgary	AB	CAN			X			
Pivot Furniture Technologies Inc.	Saskatoon	SK	CAN	X					
QB Corporation	Salmon	ID	US	X					

Table 40 - continued

ENGINEERED WOOD MANUFACTURERS IN NORTH AMERICA

March 2023

Company	City	State	Country	Glulam	CLT	I-joist	Structural Composite Lbr		
							LVL	PSL	LSL
RedBuilt	Stayton	OR	US			X	X		
RedBuilt	Windsor	CA	US	X					
ReNuTeq, Inc.									
Resolute Engineered Wood Larouche Inc	Larouche	QC	CAN			X			
Resolute Engineered Wood St-Prime Limited Partnership	St. Prime	QC	CAN			X			
Rigidply Rafters, Inc.	Richland	PA	US	X					
Rosboro Lumber Company	Springfield	OR	US	X					
Rosboro Lumber Company	Vaughn	OR	US	X					
Rosboro Lumber Company	Eugene	OR	US	X					
Roseburg Forest Products	Riddle	OR	US			X	X		
Roseburg Forest Products	Chester	SC	US			X	X		
Sentinel Structures Inc.	Peshtigo	WI	US	X					
SmartLam	Whitefish	MT	US		X				
Stark Truss Company, Inc.	Beach City	OH	US	X		X			
Sterling Solutions	Phoenix	IL	WA	X	X				
Structural Wood Systems	Greenville	AL	US	X					
StructureCraft	Abbotsford	BC	CAN	X	X				
Structurlam Mass Timber U.S.	Conway	AR	US	X	X				
Structurlam Mass Timber Corporation	Penticton	BC	CAN	X	X				
Superior Wood Structures	St-Isidore-de-Lapraire	QC	CAN			X			
Superior Wood Systems	Superior	WI	US			X			
Terminal Forest Products	Everson	WA	US	X					
Timber Technologies	Colfax	WI	US	X					
Timberweld Mfg	Billings	MT	US	X					
Unadilla Laminated Products	Unadilla	NY	US	X					
Vaagen Timbers	Colville	WA	US	X	X				
Web Joists, Inc.	Chehalis	WA	US			X			
West Fraser LVL	Rocky Mtn. House	AB	CAN				X		
Western Archrib	Boissevain	MB	CAN	X					
Western Archrib	Edmonton	AB	CAN	X					
Weyerhaeuser	Vancouver	BC	CAN						X
Weyerhaeuser	Buckhannon	WV	US				X	X	
Weyerhaeuser	Colbert	GA	US					X	
Weyerhaeuser	Deerwood	MN	US						X
Weyerhaeuser	Hazard	KY	US			X			X
Weyerhaeuser	Evergreen	AL	US			X	X		
Weyerhaeuser	Kenora	ON	CAN						X
Weyerhaeuser	Millersburg	OR	US				X		
Weyerhaeuser	Natchitoches	LA	US			X	X		
Weyerhaeuser	Simsboro	LA	US				X		
Weyerhaeuser	Valdosta	GA	US			X	X		
WFP Engineered Wood LLC.	Vancouver	WA	US	X					
WFP Engineered Wood LLC	Washougal	WA	US	X					
White River Forest Products	White River	ON	CAN	X	X				
Zip-O-Laminators LLC	Eugene	OR	US	X					

ENGINEERED WOOD GLOSSARY

STRUCTURAL WOOD PANELS

Structural Plywood: Plywood consists of veneers arranged in perpendicular layers. Performance-rated plywood is typically used in roof, floor and wall construction applications, although there are also a variety of grades for industrial applications.

Oriented Strand Board (OSB): A structural, performance-rated panel product, OSB consists of wood strands. Unlike glulam, the strands of OSB are not random, but are layered and oriented for maximum strength and stability. Designed to be used in the same construction applications as plywood.

GLUED LAMINATED TIMBER

Glulam is an engineered stress-rated product created by adhesively bonding individual pieces of lumber or structural composite lumber having a thickness of 50 mm (2 in.) or less. It can be easily shaped into forms ranging from straight beams to complex curved members and is used for a wide variety of structural applications in both residential and nonresidential construction.

CROSS-LAMINATED TIMBER (CLT)

A prefabricated solid engineered wood panel made of at least three orthogonally bonded layers of solid-sawn lumber or structural composite lumber (SCL) that are laminated by gluing of longitudinal and transverse layers with structural adhesives to form a solid rectangular-shaped, straight and plane timber intended for roof, floor or wall applications.

PREFABRICATED WOOD I-JOIST

A structural member manufactured using sawn or structural composite lumber flanges and structural panel webs, bonded together with exterior exposure adhesives, forming an “I” cross-sectional shape. These members are primarily used as joists in floor and roof construction.

STRUCTURAL COMPOSITE LUMBER

Structural composite lumber (SCL) includes laminated veneer lumber (LVL), parallel strand lumber (PSL), laminated strand lumber (LSL), and oriented strand lumber (OSL). According to ASTM D 5456, these materials are intended for structural use and are bonded with exterior exposure adhesives. The following SCL definitions come from ASTM D 5456.

Parallel Strand Lumber (PSL) PSL is a composite of wood veneer strand elements with wood fibers primarily oriented along the length of the member. The least dimension of strands shall not exceed .25 in. (6.4mm) and the average length shall be a minimum of 300 times the least dimension. PSL is commonly used for beam and column applications.

Laminated Strand Lumber (LSL): LSL is a composite of wood strand elements with wood fibers primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.10 inches (2.54 mm) and the average length shall be a minimum of 150 times the least dimension. LSL can be used for a variety of applications, including beams, headers, studs, rim boards, and I-joist flanges.

Laminated Veneer Lumber (LVL): LVL is a composite of wood veneer sheets whose fibers are primarily oriented along the length of the member. Veneer thickness shall not exceed .25 inches (6.4mm). LVL can be used in a variety of applications, including I-joist flanges, beams, headers, and studs.

Oriented Strand Lumber (OSL): OSL is a composite of wood strands whose fibers are primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.10 inches (2.54mm) and the average length shall be a minimum of 75 times the least dimension. OSL may be used in a variety of applications, including beams, headers, studs, and rim boards.

Market Outlook & Regional Production

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