

Homebuilders and Building Products

Who builds the house - 2024

Industry Overview

Overview of US residential building products industry

Our annual *Who builds the house* report and graphics summarize the major components of a single-family house in the U.S. including the cost per component, top manufacturers in each segment, and competitive dynamics across residential building products.

Cost to build a house finally hit a ceiling in 2023

The bill of materials for an average new single-family house declined (14%) YoY or roughly \$15,000 in 2023 due to lower lumber and wood product costs following three consecutive years of unprecedented inflation. The average material cost to build a home, however, is still up \$25,000 or 30% (6.9% CAGR) since 2019 compared to a roughly 33% increase in average national new home prices over the same period. In general, building product price increases have been sticky across most categories over the last few years except for commodity inputs like lumber, which have now reverted near 2019 levels.

\$105K in average new home content; \$73bn market

We estimate the value of content in an average US new single-family home was \$105k in 2023. We estimate the bill of materials to build a house has increased at a 3.8% CAGR from \$23,073 in 1982, consistently outpacing overall inflation over the last 40+ years. Since 2013, value of content has increased at a 3.9% CAGR, with a 4.4% CAGR in material prices more than offsetting a (0.4%) CAGR decline in average home square footage. All in, we estimate new residential construction market is roughly a \$73bn market opportunity for residential building products companies.

2024 cost trending slightly higher

The bill of materials to build a home is tracking up 3.2% year-to-date in 2024 driven primarily by higher OSB/plywood costs. We estimate the current cost to build at \$109K, which is 35% above 2019 levels. Outside of materials, raw land as well as development and entitlement costs for lots are rising at a faster pace than direct building costs. The construction labor market remains tight.

Total US building products opportunity is roughly \$243bn

The residential repair & remodel market is roughly 2x the size of new construction for building products companies at roughly \$143bn (excluding installation). In aggregate, after including an additional \$27bn from the commercial market (new construction and R&R content), we estimate the US building products market size at roughly \$243bn.

14 major component groups in a single-family house

We separate a new home into 14 major component groups and estimate the dollar content per average home, addressable market size, industry concentration, primary raw material inputs, major players and key trends for each. We also provide summary snapshots for the top building products companies within the major component groups.

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Refer to important disclosures on page 74 to 75.

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Exhibit 1: Major component of house

% of total content

Component group	\$CPH	% total content	Total addressable market (\$bn)
Framing Lumber/EWP	\$16,648	15.8%	\$24.8
Concrete (foundation)	\$12,560	11.9%	\$16.3
Windows & Doors	\$11,380	10.8%	\$14.5
Siding	\$9,526	9.1%	\$13.0
Plumbing	\$7,879	7.5%	\$10.1
Cabinets	\$7,690	7.3%	\$11.7
HVAC	\$7,685	7.3%	\$22.1
Roofing	\$6,329	6.0%	\$14.8
Flooring	\$7,398	7.0%	\$34.1
Structural panels	\$4,280	4.1%	\$14.6
Wallboard/Drywall	\$4,337	4.1%	\$6.3
Appliances	\$2,535	2.4%	\$40.8
Architectural coatings	\$2,591	2.5%	\$15.8
Fiberglass insulation	\$1,512	1.4%	\$4.1
Other	\$2,801	2.7%	na
Total	\$105,151	100.0%	\$243

Source: BofA Global Research estimates

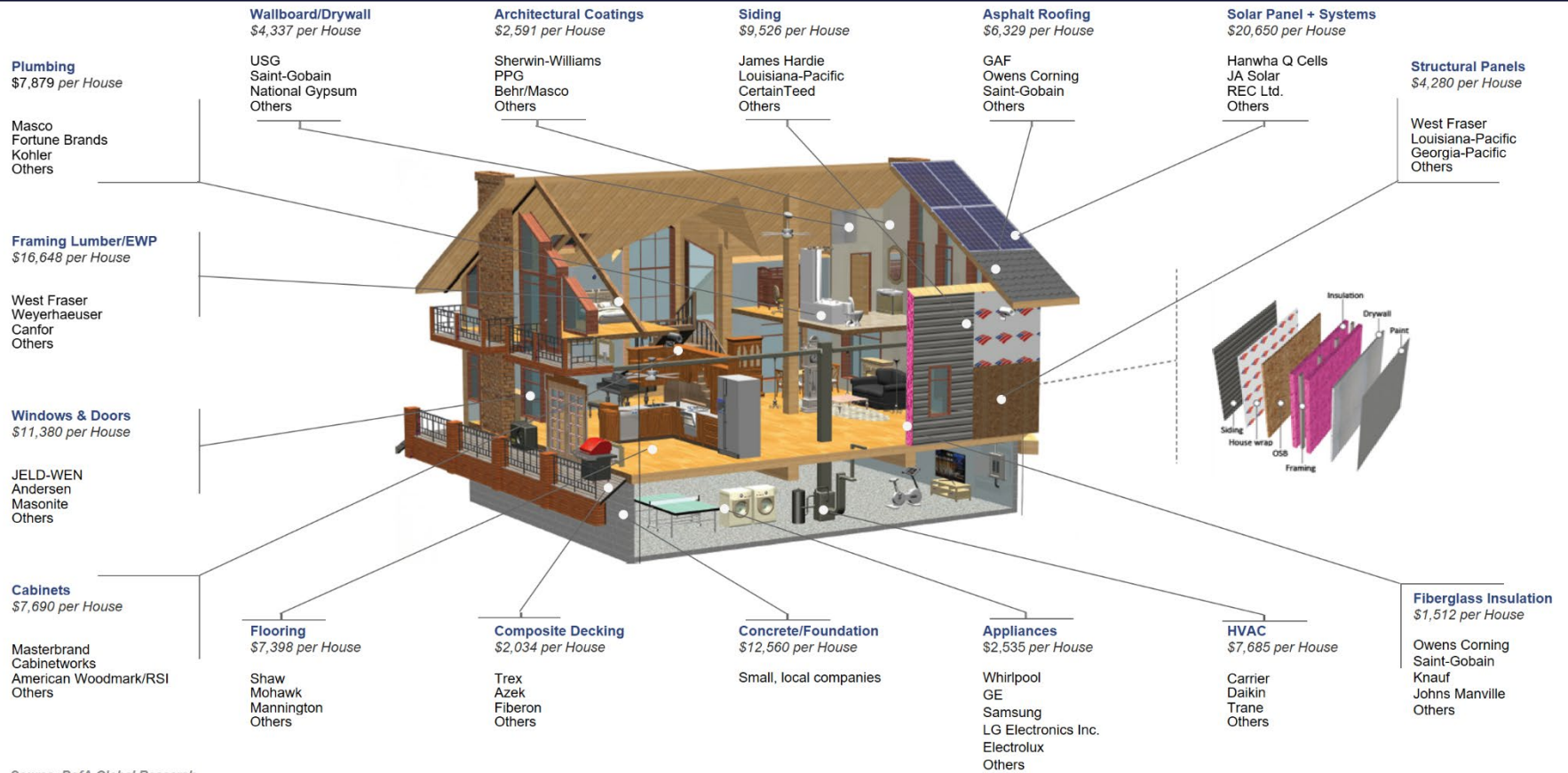
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Exhibit 2: Who Builds the House - 2024

For readers of the web-formatted version of this report, access interactive features of the visualization by clicking on the image.

Who Builds the House - 2024

Major component groups, estimated content per home and key product companies



Source: BofA Global Research

*Top 3-5 companies ranked by estimated market share

**Total content per average house includes \$2,801 of other costs;excludes decking and solar
Prepared June 2024

Total Average Content per House = \$105,151**

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Source: BofA Global Research

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Introduction and methodology

Overview of the US residential building products industry

Our analysis identifies 14 major component groups in an average new single-family home, estimates the dollar content per group and highlights key players, significant growth drivers and trends for each category.

Our 14 major component group estimates leverage data from various sources including industry contacts, company filings, the National Association of Homebuilders (NAHB) and numerous trade publications. While the component group breakout is not exhaustive (we include an “other” category), we believe it captures the most significant elements of new home construction. Our component content growth estimates incorporate the Bureau of Labor Statistics producer price indices (PPI) and US Census Bureau’s estimate of average square footage of floor area in a new single-family home.

The dollar content estimates represent what a homebuilder would theoretically pay for each component in a new construction project and is therefore influenced by sourcing channel. In other words, components purchased through distributors will typically be subject to markup, while those purchased direct from a manufacturer or through an installer would generally not contain this incremental cost.

We estimate market sizes using company specific data and industry resources. Market size calculations are based on manufacturer revenue and thus the sale price from the manufacturer to the initial customer, which as mentioned above, is often some form of re-seller. Therefore, the dollar content per home for each component group, which is the theoretical cost to a homebuilder, can differ from the manufacturers’ price.

In addition, the total addressable market sizes outlined in Exhibit 3 include commercial applications where appropriate. Therefore, the sum of the Residential new construction market and the Residential repair and remodel market columns will not necessarily equate to the Total addressable market column. We exclude the commercial market estimates on a component group basis from Exhibit 3 given that the focus of this report is on the residential markets. However, we do provide some detail on the overall commercial building products market for context.

\$105,151 in average new home content; \$73bn market

We estimate that the value of content in an average US single-family new home has grown at a compounded annual growth rate (CAGR) of 3.9% from \$71,402 in 2013 to \$105,151 in 2023. Our \$105,151 estimate includes \$2,801 of content attributable to an “other” category, which is an aggregate of sundry items outside of the 14 major groups. Materials constitute roughly 24.5% of the sale price of a new house, with the 2023 median sale price reaching \$428,600, according to the US Census Bureau. This lines up fairly well with our \$105,151 content estimate ($\$121,676/24.5\% = \$429,188$). However, in a normalized environment (ex-COVID) materials typically constitute approximately ~23% of the sale price of a new house.

In addition, we estimate an overall opportunity for building products content (excluding labor) in the US new single-family home construction market of roughly \$73bn. We derive our \$73bn estimate by multiplying the residential new construction exposure of each component group by its total addressable market and aggregating the results. This approach is backstopped by multiplying our estimated dollar content per home of \$105,151 by 2023 new home sales of 666K and by 2023 single family starts of 948K, which implies a residential new construction market range of \$70bn-\$100bn.

Cost to build a house likely to slightly increase in 2023

Based on PPI data, and assuming a stable home size, the content per home (CPH) finished 2023 (for a home started in December 2023) at \$105,387. According to our analysis, CPH has increased 3% through April to \$108,801 mainly driven by inflation in lumber and OSB/plywood.



Exhibit 3: Major component groups of a house & size of US new & repair/remodel construction opportunity for each (larger market highlighted for each)

Framing Lumber/Engineered Wood accounts for the largest % of total content

Component group	\$CPH	% total content	Total addressable market (\$bn)	Resi new construction market (\$bn)	Resi repair/remodel market (\$bn)	Top 3 players market share %
Framing Lumber/Engineered Wood	\$16,648	15.8%	\$24.8	\$7.6	\$10.4	35%
Concrete (foundation)	\$12,560	11.9%	\$16.3	\$16.3	na	na
Windows & Doors	\$11,380	10.8%	\$14.5	\$6.1	\$7.0	49%
Siding	\$9,526	9.1%	\$13.0	\$5.9	\$5.5	37%
Plumbing	\$7,879	7.5%	\$10.1	\$2.3	\$7.5	72%
Cabinets	\$7,690	7.3%	\$11.7	\$3.4	\$8.3	55%
HVAC	\$7,685	7.3%	\$22.1	\$5.5	\$16.6	62%
Roofing	\$6,329	6.0%	\$14.8	\$0.9	\$12.9	79%
Flooring	\$7,398	7.0%	\$34.1	\$5.8	\$21.5	40%
Structural panels	\$4,280	4.1%	\$14.6	\$7.2	\$3.9	67%
Wallboard/Drywall	\$4,337	4.1%	\$6.3	\$2.4	\$3.0	71%
Appliances	\$2,535	2.4%	\$40.8	\$6.1	\$34.7	72%
Architectural coatings	\$2,591	2.5%	\$15.8	\$1.9	\$11.2	79%
Fiberglass insulation	\$1,512	1.4%	\$4.1	\$1.7	\$0.8	77%
Other	\$2,801	2.7%	na	na	na	na
Total	\$105,151	100.0%	\$243	\$73	\$143	61%

Source: BofA Global Research estimates

Appliances, Fiberglass insulation, and Composite Decking include top four players' market share %; also, Framing Lumber/Engineered Wood, Windows & Doors, Flooring, Structural Panels, Wallboard/Drywall, Architectural Coatings, and Fiberglass insulation all contain a commercial market % not featured in the Exhibit
Exhibit 3 excludes the US commercial construction market for the component groups.

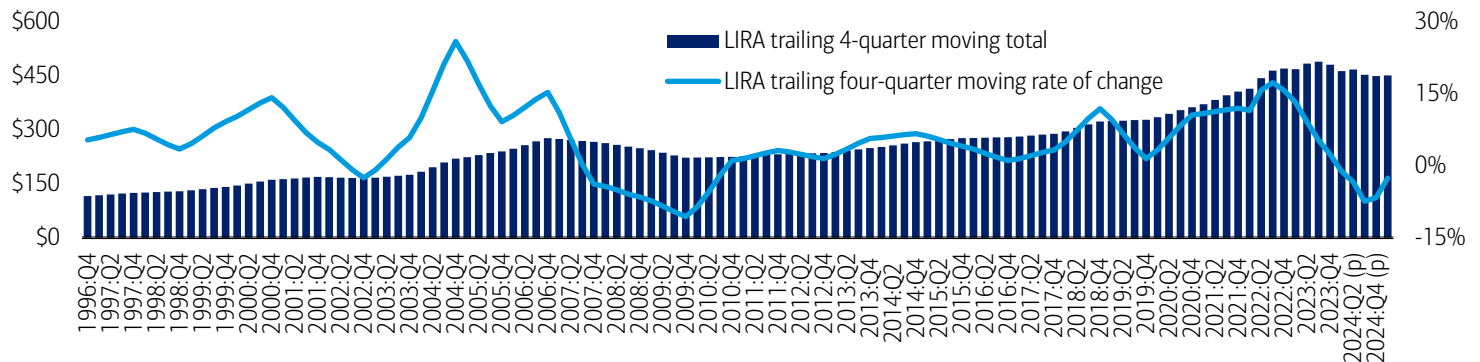
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Repair & remodel adds \$143bn to market opportunity

We estimate a current US residential repair and remodel market opportunity of approximately \$143bn for building products companies, excluding labor. We derive our \$143bn estimate by multiplying the residential repair and remodel exposure of each component group by its total addressable market and aggregating the results. In addition, Harvard's Joint Center for Housing Studies (JCHS) publishes the Leading Indicator of remodeling activity index (LIRA) and estimates the 2023 total value of US residential repair and remodel activity at roughly \$481bn, representing a CAGR of roughly 5.6% since 1997. The JCHS analysis measures the value of repair and remodel activity as reported by homeowners and therefore includes both the cost of labor and materials. Assuming labor costs represent two-thirds of the total value of repair and remodel activity on average and materials represent one-third, which is consistent with commentary from numerous building products companies, we arrive at a relatively similar material value of \$143bn (\$481bn x 33%).

Exhibit 4: Leading Indicator of Remodeling Activity (LIRA) index (2/3 labor, 1/3 materials)

The LIRA Index is projected to fall to \$451.1 in Q1 2025, a YoY decrease of -2.6%



Source: Harvard University LIRA Index

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Commercial opportunity is roughly \$27bn

Product companies have an additional \$27bn opportunity in the US Commercial construction market, as it pertains to these 16 major component systems and the “other” category. Therefore, our analysis indicates a total addressable market opportunity for building products companies of roughly \$243bn, with 30% attributable to new residential construction, 59% to residential repair & remodel activity and 11% to commercial construction (new and R&R). However, this report focuses on the US residential market opportunity.

Peak-to-trough declines also vary across sub-sectors

In addition to the historical returns generated across various building product sub-sectors, we view the relative stability of the group versus the broader housing market as attractive. In the table below, we list key housing industry and building product sub-sector peak-to-trough performances during the financial crisis, with the largest decliner (new home sales) on top and the strongest performer (Harvard’s Joint Center for Housing Studies Leading Indicator of Remodeling Activity “LIRA”) at the bottom.



Exhibit 5: Select building product sub-sector and benchmark peak-to-trough declines (% change)

Declines vary considerably across sub-sectors

	2004	2005	2006	2007	2008	2009	2010	2011	2012
New Home sales (units 000)	1,203	1,283	1,052	776	485	374	322	305	369
Peak-to-trough								(76.2%)	
Housing starts (units 000)	1,956	2,068	1,801	1,355	906	554	587	609	781
Peak-to-trough						(73.2%)			
Cabinets (\$mm)									
Cabinets revenue (MAS segment revenue)**	\$3,230	\$3,324	\$3,286	\$2,829	\$2,276	\$1,674	\$1,464	\$1,231	\$939
Peak-to-trough									(71.8%)
Wallboard (sq feet bn)									
Wallboard shipments	na	37	36	31	25	18	17	18	19
Peak-to-trough							(53.5%)		
Windows (units 000)									
Annual Window shipments	67,100	70,600	66,700	59,100	48,363	38,870	41,589	37,860	40,121
Peak-to-trough								(46.4%)	
Existing Home sales									
Peak-to-trough	6,778	7,076	6,478	5,022	4,124	4,334	4,182	4,263	4,656
					(41.7%)				
Flooring (sq feet bn)									
US Flooring Demand	28	28	27	24	21	18	18	17	18
Peak-to-trough								(38.3%)	
Roofing (sq feet mm)									
Asphalt shingles	161	173	155	129	135	120	108	122	118
Peak-to-trough							(37.6%)		
Paint									
Paint gallons sold (mm)	800	750	775	750	670	580	605	610	630
Peak-to-trough						(27.5%)			
Plumbing (\$mm)									
Plumbing revenue (MAS segment revenue)**	\$3,057	\$3,176	\$3,296	\$3,391	\$3,078	\$2,564	\$2,692	\$2,913	\$2,955
Peak-to-trough						(24.4%)			
Water heater (units 000)									
Residential gas & electric water heater shipments	9,627	9,320	9,446	8,855	8,190	7,513	7,655	7,692	7,693
Peak-to-trough						(22.0%)			
LIRA Index (\$bn)									
Peak-to-trough	\$220	\$240	\$277	\$266	\$249	\$222	\$225	\$232	\$235
						(19.6%)			

Source: US Census Bureau, Company filings, Gypsum Association, Catalina Research, A.R.M.A, ACA, SHW, MAS, Harvard Joint Center for Housing Studies, Quanex Building Products, Ducker Worldwide, AHRI, BofA

**Windows and Cabinets results based on MAS revenue, given the lack of a readily accessible segment proxy

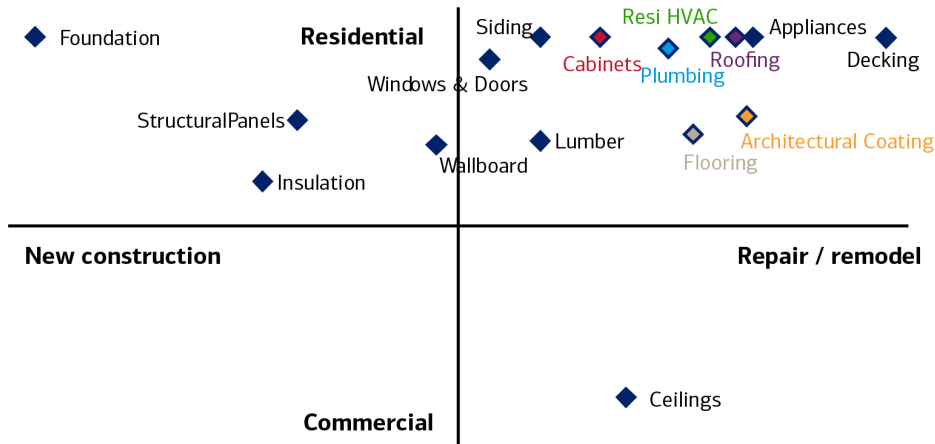
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We estimate that Flooring (-38.3%), Roofing (-37.6%), Paint (-27.5%), Plumbing (-24.4%) and Water heaters (-22%) all outperformed the peak-to-trough decline in existing home sales (-41.7%) and new home sales (-76.2%). In our view, the relative resilience of these building product sub-sectors is driven in part by above average exposure to the generally more stable residential repair and remodel industry and in some cases to less discretionary break-fix components.



Exhibit 6: Building products mix and end-market matrix by industry

The majority of our components under analysis are Residential and Repair/remodel



Source: BofA Global Research estimates; company filings; Ceilings is 95% commercial construction

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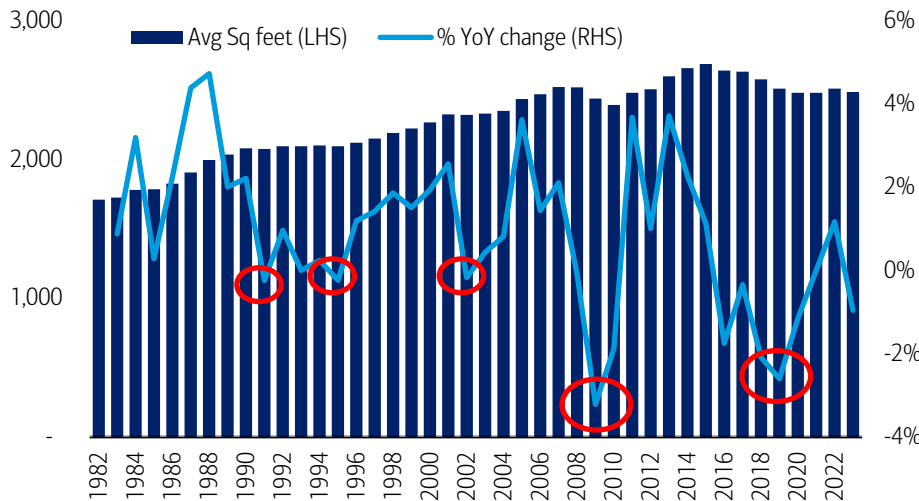
We believe that this resilience, coupled with favorable return profiles, positions these businesses reasonably well throughout the cycle.

Home sq. footage trended lower in 2023

Throughout the 35 year period from 1982 to 2017, the average square footage of a US home has declined on a YoY basis only eight times, three of which occurred during and immediately following the depths of the housing/financial crisis. Home size rose from 2011 to 2015 as entry-level new construction was constrained. Home size declined between 2016 and 2020 as more starter homes were developed. During the pandemic more residential space was needed as people use homes for more purposes including work. The housing boom after covid cause a rise for new single-family home size. According to fourth quarter 2023 data from the Census Bureau average single-family completed homes square floor area decreased to 2,485 square feet, as builders decreased home sizes to address affordability concerns.

Exhibit 7: Average square footage of a US home and YoY change

Home size decreased 1% in 2023, but was above the 2,276 average (1982-2023).



Source: Census Bureau
Note: Data through 2023

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In our view, the first-time/entry-level buyer is often motivated by life events, including marriage or child-rearing and therefore if affordability becomes a challenge, this cohort may purchase less home, but will still likely buy a home. In contrast, the move-up/luxury buyer that typically traffics at higher price points may simply wait for a better opportunity. Going forward, we expect a declining home size trend as people have tighter budgets due to macroeconomic instability and elevated prices especially for first-time/entry-level buyers.

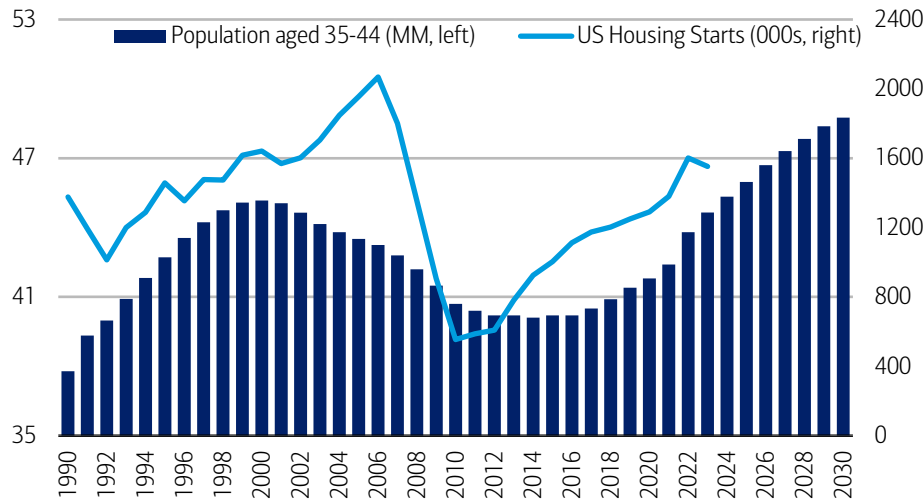
Millennial’s homebuyer tailwind is still in mid stages

Long viewed as the generation that would never leave their parents’ basements, millennials have become more active in the home buying market over the past couple of years. See the latest BofA note [2023 Millennial housing survey](#). The tailwind from millennial homebuyers is still in mid stages as affordability remains a key concern. According to a BofA survey, 66% of respondents said they were likely to buy a home in the next 2 years and 58% responded that they own their home, up from 53% in 2022. The latest Census Bureau data showed that 51.5% of Millennials were homeowners as of 2022.

Rising Millennial homeownership rates should also provide a medium-term tailwind to the home improvement retail industry. 82% of those surveyed stated a preference to buy an older, less expensive home and renovate it to save money rather than buy a newly built home. We view Millennials’ willingness to renovate older homes as a bullish indicator for future home improvement demand. Increasing Millennial homeownership should provide a boost to home improvement demand in the next 12 months. The home improvement projects most often completed by Millennials include painting/wallpapering (32%), landscaping (27%) and upgrading appliances (27%), while many high-ticket projects like bathroom remodels (17%), flooring (15%) and patio/deck/garage & driveway improvements (15%) are still on the to-do list for the next 12 months.

Exhibit 8: US population aged 35-44 and housing starts

Increasing amount of 35-44-year-olds in the US should be favorable for housing starts



Source: Census Bureau, Euromonitor

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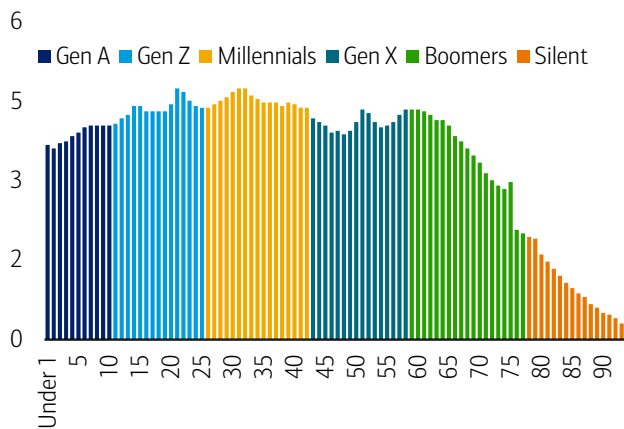
Aging millennials will drive homeownership rates higher

US homeownership rates jump from mid-30% for 25-29-year-olds to 60% for 35-39-year-olds and overall homeownership rates should benefit from aging millennials (average age of 33.9 years old). Around 46% of millennials are 35-42 years old. The amount of 35-44-year-olds (historically a leading indicator of housing starts). Almost all categories are below the homeownership rate average (1994-2022) except under 25 years old.



Exhibit 9: US population by age (in millions)

Millennials are now approaching peak home buying age

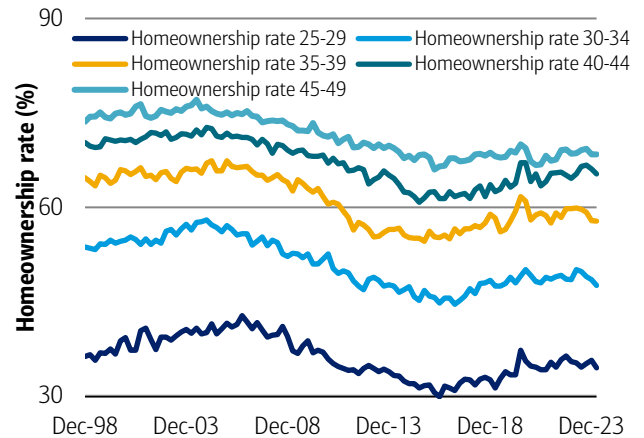


Source: Pew Center

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Exhibit 10: Homeownership rates by age

Homeownership rates jump as buyers enter their 30s



Source: Census Bureau

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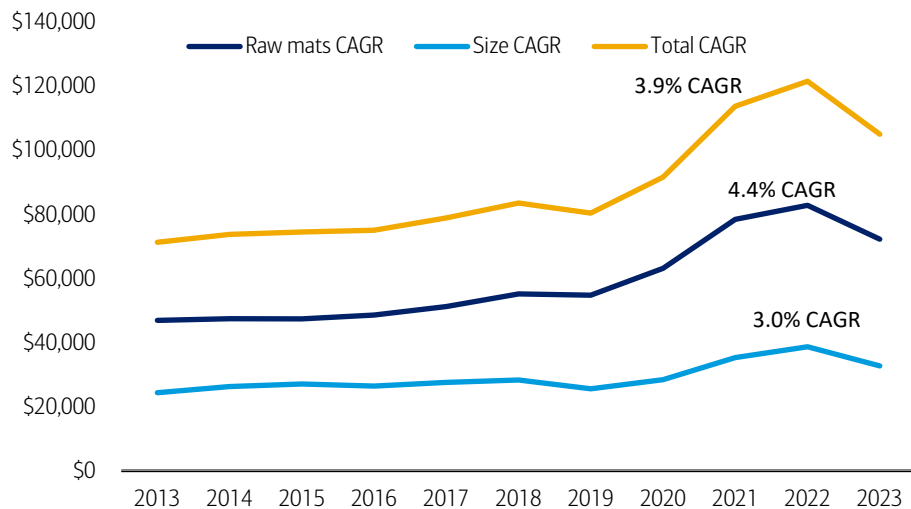
16 component groups and top suppliers

Component content calculation

Based on 16 distinct producer price indices (including “other” category), we estimate that the raw material content in an average single-family home increased from roughly \$71,402 in 2013 (base year, index=100) to \$105,151 in 2023, representing a raw material content CAGR of 3.9%.

Exhibit 11: Effect of raw material costs and changes in home size on content growth

The raw material content in an average single-family home fell to \$105,151 in 2023



Source: PPI, NAHB, BofA Global Research estimates

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Component group summaries

In this section we summarize each component group in snapshot format for ease of use. We focus on estimated dollar content per average home, the addressable market size, industry concentration, primary end-markets, key raw material inputs, major market participants and current trends for each group. Market share estimates are derived by dividing the corresponding segment revenue of each company by the estimated total addressable markets shown in Table 2. In terms of industry concentration, we consider aggregate market share of the top three players of less than 50% as fragmented, between 50-75% as semi-consolidated and greater than 75% as consolidated. We note



that the Appliances group is categorized as semi-consolidated under the parameters of this definition. However, we estimate that the number three through five players each command greater than 10% share and thus including all three would result in a consolidated sector. The component groups are presented in order of greatest dollar content per home (lumber) to least (insulation), with the “other” category listed last.

Framing Lumber/Engineered Wood Products

Framing includes both lumber and engineered wood (joists and engineered beams). We estimate the NA softwood lumber market was roughly \$25bn in 2023. The framing lumber market is fragmented, with the top four producers, West Fraser (WFT), Interfor (IFP), Canfor (CFP), and Weyerhaeuser (WY) accounting for approximately 43% share. WFT has 6.7bbf of lumber capacity across sawmills in the US and Canada while WY, IFP and CFP each have roughly 5bbf of lumber capacity in North America and are effectively in a three-way tie for second place.

Exhibit 12: Framing Lumber/Engineered wood products

We estimate the Framing Lumber/Engineered wood products market is \$24.8bn

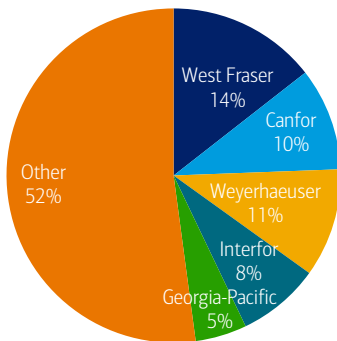
Estimated \$ CPH	\$16,648*
Estimated market size	\$24.8bn
Concentration	Fragmented
Primary end-market	Repair & remodel
Key raw material inputs	Wood (Douglas Fir, Southern Pine and Hemlock)
Major market participants	West Fraser, Canfor, Weyerhaeuser, Georgia-Pacific

Source: BofA Global Research estimates, RISI; *CPH estimate per BofA Homebuilding & Building Products team

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Exhibit 13: NA lumber market share by producer

The top three NA lumber producers accounted for 35% of market share in 2023 by capacity

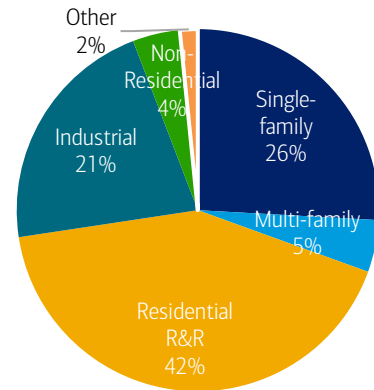


Source: Fastmarkets RISI Mill Database

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Exhibit 14: NA Lumber Consumption by End-Market

R&R comprised 42% of NA lumber consumption in 2023



Source: Fastmarkets RISI Mill Database

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Exhibit 15: Lumber raw material input price index (\$/mbf)

Lumber prices remain above pre-pandemic levels



Source: Fastmarkets RISI Random Lengths

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Framing Lumber trends: Prices have been okay, not great

During the pandemic lumber prices climbed well-above prior record levels and peaked in May 2021. A surge in construction activity for new and repair/remodel projects, coupled with supply constraints caused two massive peaks in the spring of 2021 and 2022. Prices are currently in the range of \$400-\$450/mbf which we would view as normal given inflation, secular trends, and manufacturing costs for fourth-quartile mills (roughly \$400-500/mbf based on Fastmarkets mill database).

Framing Lumber material cost trends: More favorable in recent period

Cash costs dropped about 15% in 2023 v. 2022 (average cash costs were about \$385/mbf, per Fastmarkets) and relatively flat in 2024. Interestingly while fiber costs have continued to drop (about \$9/mbf) in 2024 per Fastmarkets, labor and other costs have offset this.

Concrete (foundation)

The US cement and concrete industry generates approximately \$62.7bn of annual revenue, with ~26% of volume attributable to residential construction. The concrete has an estimated cost per home of \$12,560. The industry is highly competitive and fragmented. Therefore, companies in the industry tend to grow by acquiring existing facilities to enter new markets or extend existing positions. In August 2021, Vulcan acquired the public U.S. Concrete, Inc. According to Vulcan’s 2023 10-K, ready-mixed concrete shipments increased 88% YoY in 2022 but decreased 29% YoY in 2023 (incl. divested ops in NJ, NY, and PA) totaling \$1,249.3 million (vs \$1,593.9 million last year). This could give us an idea of the concrete market. Average selling prices increased 11%. However, there is limited data available, as it tends to constitute only a small portion of revenue for public companies.

Exhibit 16: Concrete

Concrete is a fragmented market with an estimated \$ CPH of approximately \$12,560

Estimated \$ CPH

- Concentration
- Primary end-market
- Key raw material inputs
- Major market participants

Source: BofA Global Research estimates, Vulcan

\$12,560

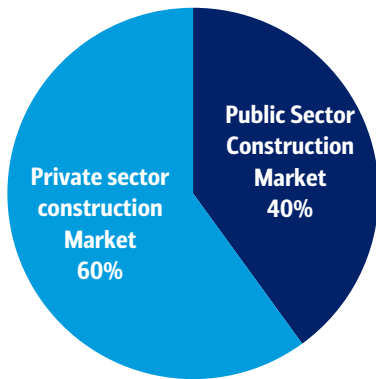
- Fragmented
- New construction
- Cement, aggregates, water
- Small, local players

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Exhibit 17: Estimated US ready-mix concrete demand by end-market

The private sector construction market accounts for nearly ~60% of concrete demand by end-market

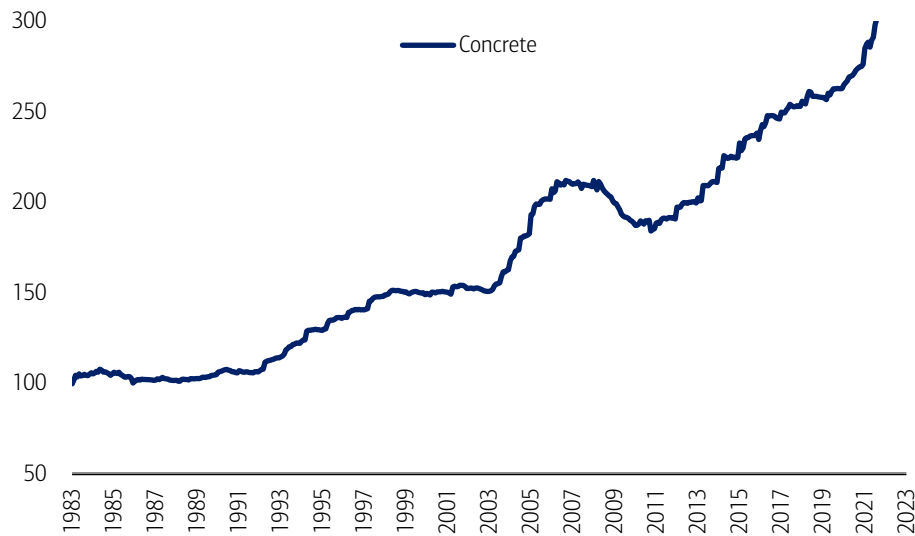


Source: Vulcan, BofA Global Research

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Exhibit 18: Concrete raw material input price index (PPI)

9% increase YoY in December 2023



Source: Bureau of Labor Statistics

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Windows and Doors

We estimate the North American window and door market at approximately \$14.5bn, skewed slightly towards new residential construction (~48%) relative to residential repair & remodel (~42%), with some exposure to commercial (~10%). The windows and doors market is fragmented, with the top three producers, JELD-WEN, Andersen and Masonite accounting for approximately 48% share. The remaining 52% is spread among other large national players (Ply-Gem, Pella), regional players and smaller, custom shops. Windows and doors tend to be among the more labor-intensive building products industries, with distribution generally conducted on a regional basis rather than nationally.



Exhibit 19: Windows and Doors

Windows and doors are a fragmented market where the estimated \$ CPH is around \$11,380

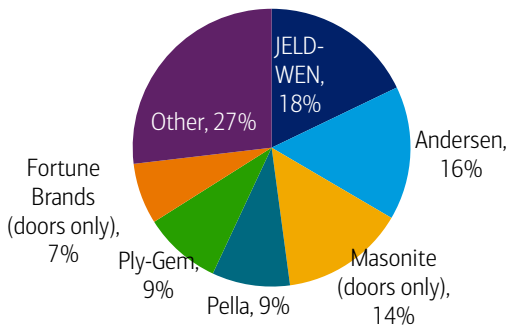
Estimated \$ CPH	\$11,380
Estimated market size	\$14.5bn
Concentration	Fragmented
Primary end-market	Repair & remodel, New construction
Key raw material inputs	Wood veneer, composite wood, steel, glass, fiberglass, vinyl, aluminum
Major market participants	JELD-WEN, Andersen, Masonite

Source: BofA Global Research estimates, company filings

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Exhibit 20: Estimated North American window and door market share

JELD-WEN is the individual market leader in the fragmented windows and doors market

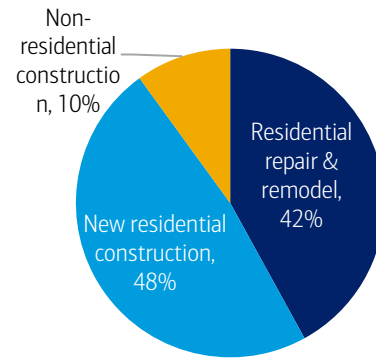


Source: BofA Global Research estimates, company filings

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Exhibit 21: Estimated window and door demand by end-market

New residential construction accounts for nearly half of estimated window and door demand by end-market



Source: BofA Global Research estimates, company filings

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Window and Door trends:

Windows and Doors manufacturers compete based upon product design, quality, functionality, price and the ability to provide service and distribution. Customers tend to be sticky given required investment in displays, showrooms/inventory and the existence of rebate programs. Industry Material breakdown according to The Freedonia Group: Global Windows & Doors study (August 2022) is divided into 24% metal, 41% Wood, 31% Vinyl and 4% Fiberglass.

Siding

We estimate the North American exterior siding market at approximately \$13bn. The largest portion of demand comes from residential repair & remodel at 42%. The siding market is fragmented with the top four market participants accounting for ~42% market share. James Hardie (JHX, fiber cement) and Louisiana-Pacific (LPX, wood) are the market leaders with ~22% and ~10% market share, respectively. Ply-Gem and CertainTeed (both vinyl) are the next biggest players with 5% and 5% market share, respectively.



Exhibit 22: Siding

Siding is a fragmented market with an estimated \$ CPH of \$9,526

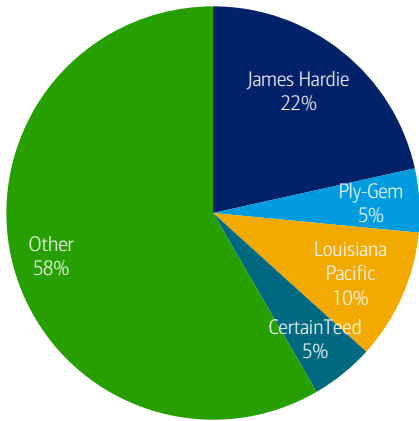
Estimated \$ CPH	\$9,526
Estimated market size	\$13.0bn
Concentration	Fragmented
Primary end-market	Repair & remodel
Key raw material inputs	Vinyl, stucco, brick, fiber cement, wood
Major market participants	James Hardie, Ply-Gem, Louisiana Pacific, CertainTeed

Source: BofA Global Research estimates, company filings

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Exhibit 23: Estimated North American siding market share

James Hardie is the individual market leader within NA siding

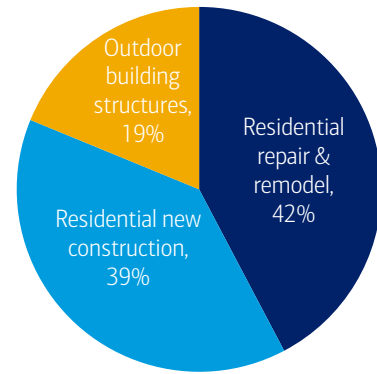


Source: BofA Global Research estimates, company filings

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Exhibit 24: Estimated siding demand by end market

Residential new construction accounts for about 39% of end demand

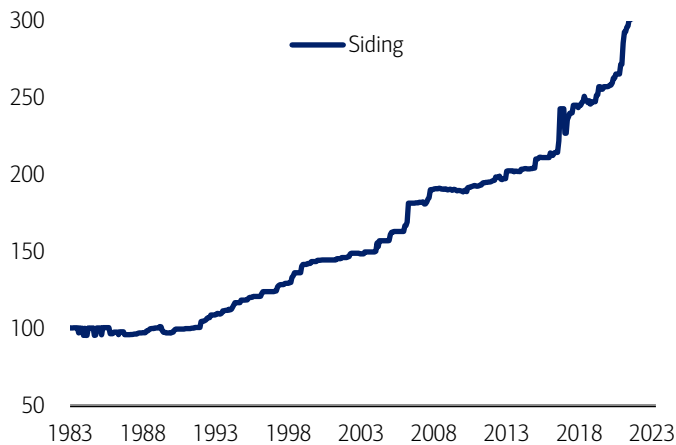


Source: BofA Global Research estimates, company filings

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Exhibit 25: Siding raw material input price index (prepared asphalt, tar roofing and siding products)

Siding PPI was up 4% yoy in 2023 (vs +17% yoy in 2022)



Source: Bureau of Labor Statistics

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Siding trends:

Siding is installed on the exterior of a home to provide protection from weather and add an aesthetic element. As such, homeowners are increasingly mixing and matching siding materials to enhance exterior design, with preferences tending to vary by region. Fiber cement has made steady market share gains for past many years at the expense of vinyl given: (1) superior durability (resistance to fire and water); (2) better curb appeal; and (3) low maintenance offering.

Siding cost trends:

Siding costs inflation have moderated with +4% yoy in 2023 versus +17% yoy in 2022 given easing of both supply chain and labour constraints.



Plumbing

We estimate the North American plumbing market at approximately \$10.1bn, with demand skewed to residential repair and remodel activity. The industry is semi-consolidated with the top three market participants, Masco, Fortune Brands and Kohler collectively accounting for roughly 72% share. Plumbing tends to be less capital intensive than many building products industries, as the majority of components are sourced from low cost, foreign countries.

We estimate that the plumbing industry is approximately 74% exposed to the residential repair and remodel market, 23% to new residential construction and 3% to commercial. From a channel perspective, plumbing sales to all U.S. home centers represent approximately 22% of net sales in 2023. The Home Depot and Lowe’s comprised approximately 21% of FBIN’s net sales in 2023. On the other hand, MAS derives 19% of its plumbing sales from retailers.

Exhibit 26: Plumbing

Plumbing is a semi-consolidated market with an estimated market size of \$10.1bn

Estimated market size \$10.1bn

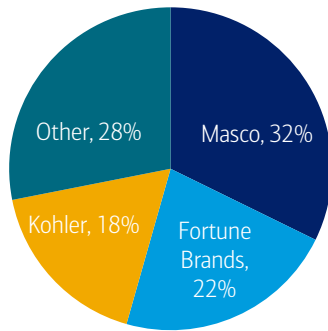
Concentration	Semi-consolidated
Primary end-market	Residential repair & remodel (74%) and residential new construction
Key raw material inputs	Copper, zinc, brass, resins, stainless steel
Major market participants	Masco (ticker: MAS), Fortune Brands (ticker: FBIN), Kohler (private)

Source: BofA Global Research estimates; MAS, FBIN

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Exhibit 27: Estimated North American plumbing market share

Masco has the leading individual market share at ~32%

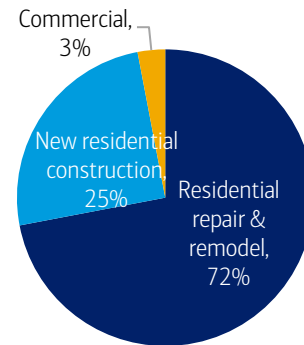


Source: BofA Global Research estimates; company filings

BofA GLOBAL RESEARCH

Exhibit 28: Estimated North American plumbing demand by end-market

R&R comprises ~72% of total plumbing demand by end-market



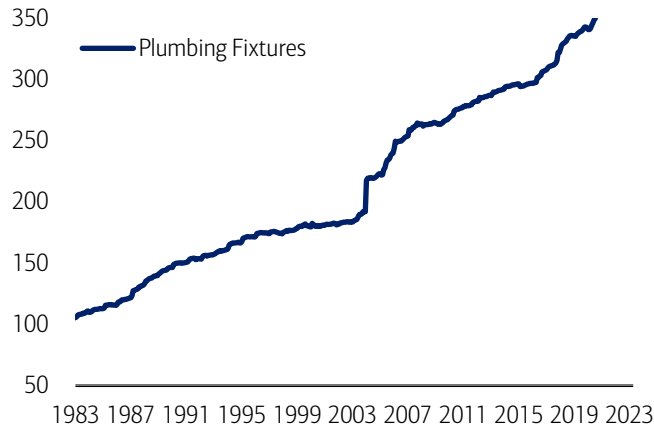
Source: BofA Global Research estimates; company filings

BofA GLOBAL RESEARCH



Exhibit 29: Plumbing raw material input price index (PPI)

1.5% YoY increase in Dec 2023 (vs. 9.6% YoY increase in Dec 2022)



Source: Bureau of Labor Statistics

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Plumbing trends:

According to plumbing experts, the coming year will be relatively neutral with price increases and movements. In 2023, FBIN’s Water segment was slightly down (0.3%) YoY and MAS’s plumbing segment was down (7.8%). Experts see the highest delta in the plumbing category in new homes, but plumbing is expected to remain depressed while the residential & repair market remains weak.

In February 2024, FBIN acquired SpringWell Water Filtration Systems, a provider of residential whole-home water filtration and water softening solutions via direct-to-consumer channels.

Cabinets

We estimate the US cabinets market at approximately \$11.7bn, with demand primarily driven by residential repair and remodel activity. The industry is semi-consolidated with 45% share attributable to regional and smaller family businesses. The top three market participants include Masterbrand (formerly a part of FBHS), Cabinetworks and American Woodmark and RSI, with collective market share of roughly 55%. Cabinet businesses tend to be fairly localized from a manufacturing and distribution perspective and are more labor intensive than many other building products industries.

We estimate that the cabinets industry is approximately 71.5% exposed to the residential repair and remodel market and 28.5% to new residential construction. From a demand perspective, 37-43% of sales are attributable to home centers such as Home Depot and Lowe’s.

Exhibit 30: Cabinets

Cabinets is a fragmented market with an estimated \$ CPH of \$7,690

Estimated \$ CPH	\$7,690
Estimated market size	\$11.7bn
Concentration	Semi-consolidated
Primary end-market	Repair & remodel
Key raw material inputs	Hardwood lumber, plywood, particleboard
Major market participants	Fortune Brands, American Woodmark, Cabinetworks

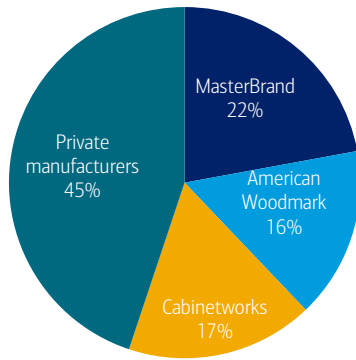
Source: BofA Global Research estimates; KCMA, AMWD, FBHS

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Exhibit 31: Estimated North American cabinets market share

The top three competitors comprise ~55% of the total cabinets market share

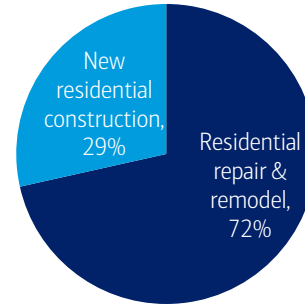


Source: BofA Global Research estimates, company filings

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Exhibit 32: Estimated North American cabinets demand by end-market

R&R comprises approximately 72% of cabinets demand by end-market

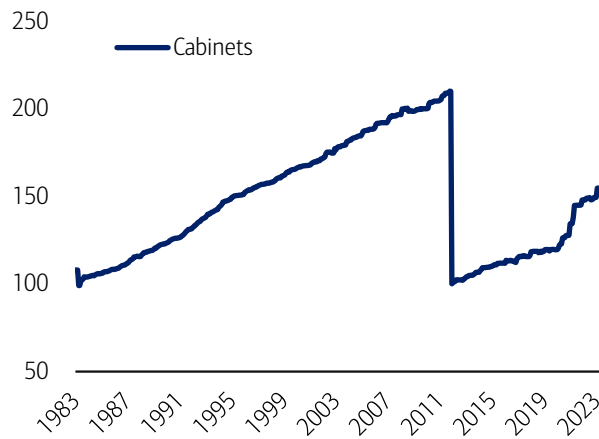


Source: BofA Global Research estimates, FBIN

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Exhibit 33: Cabinets raw material input price index (PPI)

0.9% increase in December 2023 (vs. 15.9% YoY in December 2022)



Source: Bureau of Labor Statistics

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Cabinet trends:

The U.S. cabinetry industry operates in a semi-conducted industry that is composed of several local, regional, and national manufacturers. The market is subject to changing consumer trends, demands, and preferences. According to the Kitchen Cabinet Manufacturers Association’s (KCMA), 2023 was a weak year with custom sales up 5%, semi-custom sales up 0.5%, and stock sales down (19.4%) compared to 2022. Cabinet quantity was down (14.3%) YoY.

Residential HVAC

We estimate the North American residential heating, ventilation and cooling (HVAC) market at approximately \$22.1bn, with approximately 77.5% exposure to the repair and replacement end-market and 22.5% to new construction. The industry is semi-consolidated with the three top market participants, Carrier, Daikin, and Trane Technologies, collectively accounting for roughly 62% share.

Exhibit 34: HVAC

HVAC is a semi-consolidated market with an estimated \$ CPH of \$7,685

Estimated \$ CPH	\$7,685
Estimated market size	\$22.1bn
Concentration	Semi-consolidated
Primary end-market	Repair & remodel
Key raw material inputs	Steel, copper, aluminum
Major market participants	Carrier (UTX), Trane (IR), Daikin

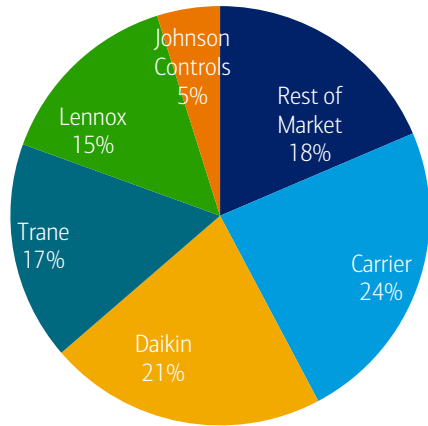
Source: BofA Global Research estimates; LII, IR

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Exhibit 35: Estimated North American resi HVAC equipment market

Carrier is #1 player in North American resi equipment

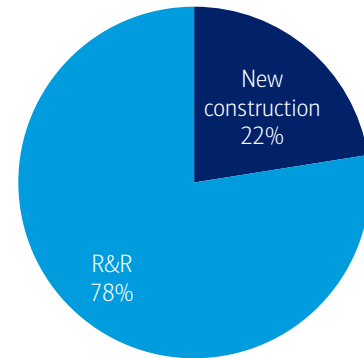


Source: BofA Global Research estimates company filings

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Exhibit 36: Estimated North American resi HVAC demand by end-market

R&R comprises approximately 78% of NA resi HVAC demand by end-market

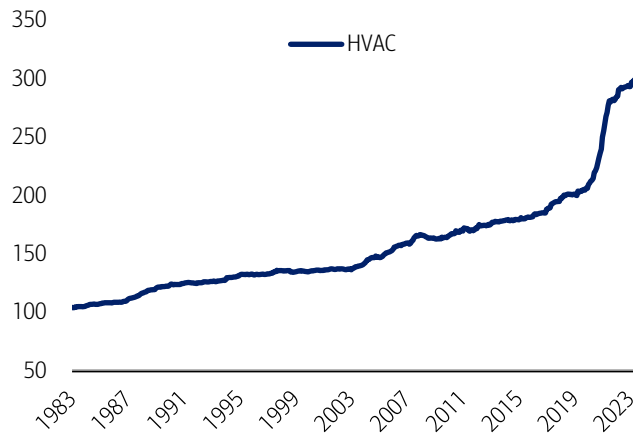


Source: Lennox

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Exhibit 37: HVAC raw material input price index (PPI)

3.8% YoY increase in December 2023 (vs. 17.8% YoY in December 2022)



Source: Bureau of Labor Statistics

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Residential HVAC trends:

Industry trends indicate that energy efficiency and environmental regulation along with the use of cloud-based technology are contributing to growth, particularly for retrofit markets. Health, sustainability and smart, integrated systems are the three main pillars for the coming years. 40% of greenhouse gas emissions are attributable to buildings and HVAC contributes by 15%. In 2023, the Department of Energy (DOE) enact a new minimum efficiency requirement for residential and commercial HVAC equipment. In 2025 there is an upcoming regulation to limit GWP in new air conditioning equipment to 700.

Asphalt Roofing

We estimate the US residential asphalt roofing and components market is approximately \$14.8bn and is heavily skewed toward repair and remodel activity. The US roofing industry is consolidated with the top three market participants: GAF, Owens Corning and CertainTeed (a division of Saint-Gobain) commanding an estimated 79% market share. Roofing tends to be a relatively low capital intensity industry, with the price of asphalt shingles historically dependent upon the price of oil.

We estimate that roofing is a residential focused business as it accounts for 97% of its sale vs 3% commercial and industrial. According to the OC investor presentation, age related & economic factors (R&R) is the main driver of U.S. asphalt shingle demand (50%), followed by major storms (19%), other weather events (16%) and new construction (15%).



Exhibit 38: Roofing

Roofing is a consolidated market with an estimated \$ CPH of \$6,329

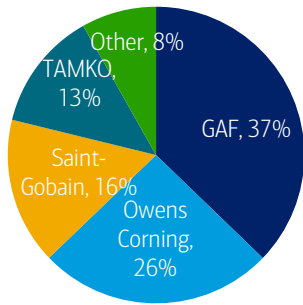
Estimated \$ CPH	\$6,329
Estimated market size	\$14.8bn
Concentration	Consolidated
Primary end-market	Repair & remodel
Key raw material inputs	Asphalt, oil, glass-mats, granules
Major market participants	GAF, Owens Corning, Saint-Gobain

Source: BofA Global Research estimates, OC, Principia Partners

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Exhibit 39: Estimated US asphalt roofing market share

GAF is the individual market leader in US asphalt roofing

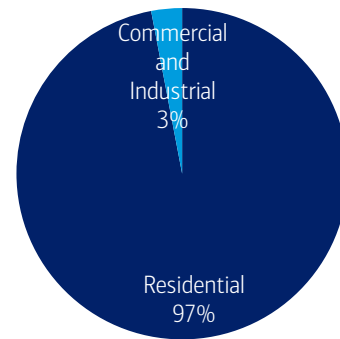


Source: Company reports, BofA Global Research estimates

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Exhibit 40: Estimated Asphalt roofing demand by end-market

Residential comprises approximately 97% of asphalt roofing demand by end-market

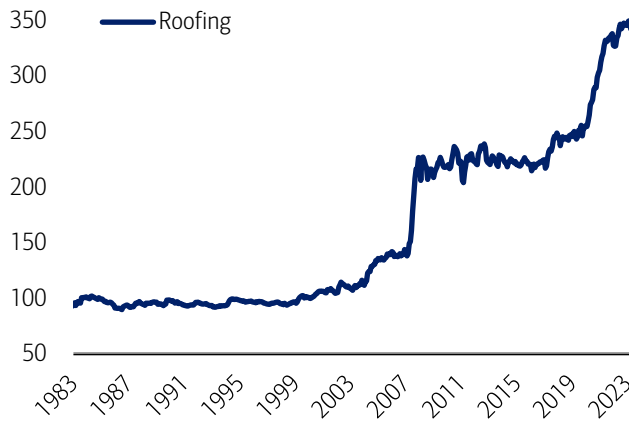


Source: Company reports, BofA Global Research estimates

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Exhibit 41: Roofing raw material input price index (PPI)

2.6% YoY increase in December 2023 (vs. 11.7% YoY in December 2022)



Source: Bureau of Labor Statistics

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Roofing trends:

Roofing volumes could strengthen in 2024 as Asphalt shingles shipments, the most popular roofing material (80% of re-roofing project in the US use asphalt singles), are up 27.2% YoY according to the latest ARMA report. The report also shows a decline in built-up roofing base, ply and mineral cap sheets shipments of (16.2%) YoY. On the other hand, the modified Bitumen market rose 11.2% (used on low-slope roofs). Roofing experts anticipate markets outside the Southeast to realize around 5% increase from the June/July price hikes after realizing majority of the April price hikes. Roofing experts also see potential for another increase in the fall if there is an active hurricane season. Residential supply remains tight, as OC and CertainTeed are on allocation with expected delivery times of 6-8 weeks (vs. normal 2 weeks). Smaller brands (IKO and Tamko) have more availability, but still have longer delivery times than normal (4 weeks vs. normal 2 weeks). GAF, the largest manufacturer, is also technically on allocation, but has been delivering orders on time. Manufacturers are building new plants (GAF, IKO) or renovating plants for more capacity (Owens Corning, CertainTeed, Tamko), but will not have significant impact near-term. GAF commenced construction on a new facility in Kansas in June 2024, but production is not anticipated to begun until 2027 (full production in 2029) and has committed to winding down another facility in Dallas by 2029.



Flooring

We estimate the US flooring market at roughly \$34.1bn, with demand skewed toward residential repair and remodel activity. The industry is fragmented with the top three market participants Shaw, Mohawk, and Mannington accounting for roughly 40% market share.

We estimate that the flooring industry is roughly 63% exposed to residential replacement activity, 20% to commercial and 17% to residential new construction. As of 1Q24, by product type, the US flooring industry consists of about 33% carpets/rugs, 33% resilient flooring, 13% Wood flooring, 12% Ceramic, 6% stone and 3% laminate.

Exhibit 42: Flooring

Flooring is a fragmented market with an estimated \$ CPH of \$7,398

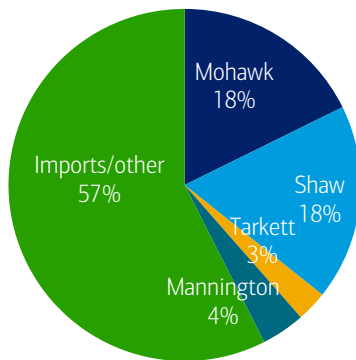
Estimated \$ CPH	\$7,398
Estimated market size	\$34.1bn
Concentration	Fragmented
Primary end-market	Repair & remodel
Key raw material inputs	
<i>Carpets/rugs</i>	Nylon, triexta, polyester, polypropylene, latex
<i>Ceramic tile</i>	Clay, talc, minerals and glazes
<i>Hardwood</i>	Lumber, resins
<i>Vinyl</i>	PVC resins, glass fiber, plasticizers
Major market participants	Mohawk, Shaw, Mannington

Source: BofA Global Research estimates, company filings

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Exhibit 43: Estimated US flooring market share

Mohawk and Shaw are the market share leaders in US flooring

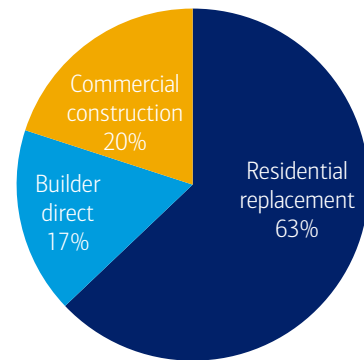


Source: company filings

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Exhibit 44: Estimated US flooring demand by end-market

Residential replacement comprises approximately 63% of US flooring demand by end-market



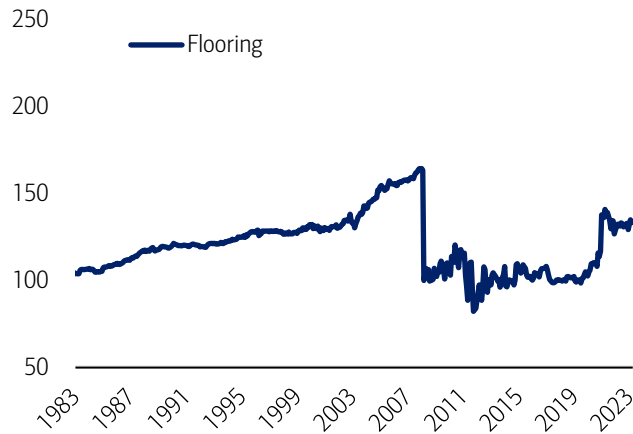
Source: Flooring cover weekly

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Exhibit 45: Flooring raw material input price index (PPI)

1.9% YoY increase in December 2023 (vs. 10.7% YoY in December 2022)



Source: Bureau of Labor Statistics

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Flooring trends:

Trends in the US flooring industry include an outperformance in laminate, which Mohawk is the largest producer, due to a migration away from LVT. Hardwood and carpet sales remain sluggish in the beginning of 2024 as overall demand remains weak especially in residential repair & remodel. Flooring expert says 1Q24 demand was relatively in-line with normal seasonality vs. 2H23. Remodeling demand continues to be very slow on weak existing home turnover and higher rates. US commercial demand continues to diminish. Europe is slightly worse than the US, but there are some bright spots in Southern Europe. In 1Q, pricing was flat vs. 3Q/4Q23 levels, but seeing some renewed pricing pressure recently, as demand has remained weak for longer than expected. Carpet prices have held up better than other categories. Carpet and rugs remain the industry leaders on a volume basis, since this sector has the lowest installed cost.

Structural Panels

Within the structural panels market, oriented strand board (OSB) and plywood are the primary grades used in new residential construction and repair & remodel activity. By our estimates, the structural panels market equates to a combined \$14.5bn NA market, with OSB at roughly \$8.2bn and plywood at \$6.3bn.

The OSB market is semi consolidated with the top three producers, West Fraser, Louisiana-Pacific and Georgia-Pacific, having roughly 64% of capacity, according to Fastmarkets. Interestingly, the #4 and #5 player combine for 21%, so the top 5 represent 85% share. By comparison, the plywood industry is more fragmented with the top three producers representing only 53% of capacity, with Boise Cascade (BCC) the largest publicly-traded US equity. From an end market standpoint, roughly 76% of OSB consumption comes from new home construction and repair & remodel activity while for plywood about 55% of consumption comes from these end markets. Plywood imports can represent a sizable share of North American plywood consumption, by our estimates 16% in 2023 (Fastmarkets, RISI). Key inputs to follow for the OSB market are pulpwood, residual wood chips and resin prices, while whole logs and the related veneers that come from the logs, as well as resins are critical to plywood.

Exhibit 46: Structural Panels

Structural panels are in a semi-consolidated market with an estimated \$ CPH of \$4,280

Estimated \$ CPH	\$4,280
Estimated market size	\$14.5bn
Concentration	Semi-consolidated (OSB), Fragmented (Plywood)
Primary end-market	New construction
Key raw material inputs	Wood, resin, wax
Major market participants	West Fraser, Louisiana-Pacific, Georgia-Pacific, Weyerhaeuser

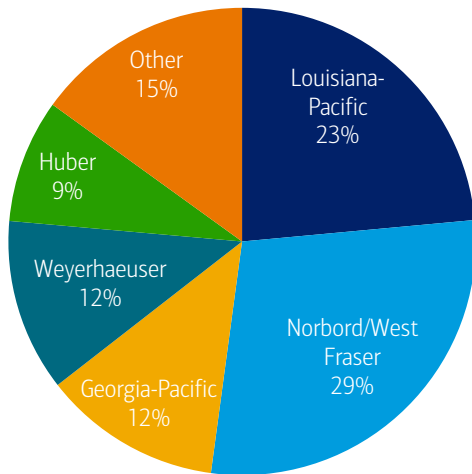
Source: BofA Global Research estimates, RISI

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Exhibit 47: NA OSB Market Share

West Fraser is the largest producer of OSB in NA based on capacity

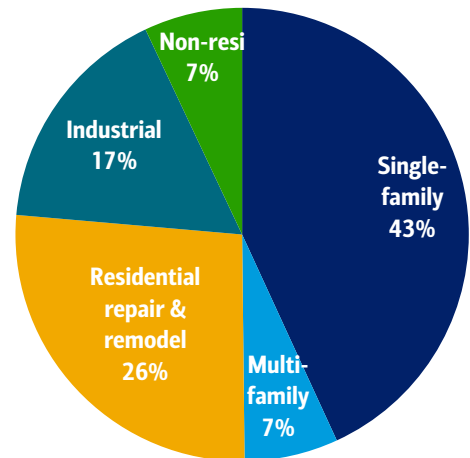


Source: Fastmarkets RISI NA Structural Panels Capacity

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Exhibit 48: NA OSB Consumption by End Use

Single-family comprises 43% of NA OSB Consumption by End Use



Source: Fastmarkets RISI NA Structural Panels Appendix

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Exhibit 49: Structural panels price index

Structural panels prices have dropped sharply after March 2022



Source: Fastmarkets RISI PPI

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Structural panels trends: Prices remain healthy

OSB has gained share from plywood since LPX introduced the product to the market in the 1982. Structural panel prices climbed and ultimately peaked in June 2021 due to limited supply and strong pandemic demand, following along with the trends noted above in lumber. Prices declined somewhat but rallied from 4Q21 to 1Q22 – similar to the lumber trend during the pandemic and then in the immediate aftermath. Prices have since dropped back to more normal levels, particularly in OSB, on more relaxed supply chains, but remain well above cash cost (and reinvestment) levels. OSB prices in the range of \$250-270/msf are relatively normal and allow for sufficient return after cash manufacturing costs we'd place at \$175-\$200/msf, depending on the region. Plywood normally prices at a \$100/msf spread to OSB, but spreads have been elevated due to supply constraints, including relatively recent certification restrictions on imported South American plywood (which may be now easing).

OSB costs have been fairly stable

Manufacturing costs for OSB have been comparatively stable. After increasing 4-5% in 2023 based on Fastmarket data, costs appear to have dropped comparably in more recent periods.

Wallboard/Drywall

We estimate the US wallboard market at approximately \$6.3 bn. The principal sources of demand for gypsum wallboard are (i) residential construction, (ii) repair and remodeling, (iii) non-residential construction, and (iv) other markets such as manufactured housing. According to the Gypsum Association, industry shipments of gypsum wallboard decreased (4%) to ~27.0 billion square feet in calendar 2023. Saint-Gobain estimates that 50% of its sales came for R&R, 23% for new residential construction and 27% new non-res/industries. The US wallboard market is semi-consolidated with the top three market participants commanding ~70% share. Wallboard tends to be a relatively capital-intensive building products business, with pricing and distribution focused regionally.



USG (owned by Knauf), National Gypsum Company, Certaineed (owned by Saint-Gobain), and Georgia Pacific (owned by Koch Industries) – account for approximately 85% of gypsum wallboard sales in the U.S.

Exhibit 50: Wallboard

Wallboard is a semi-consolidated market with an estimated \$ CPH of \$4,337

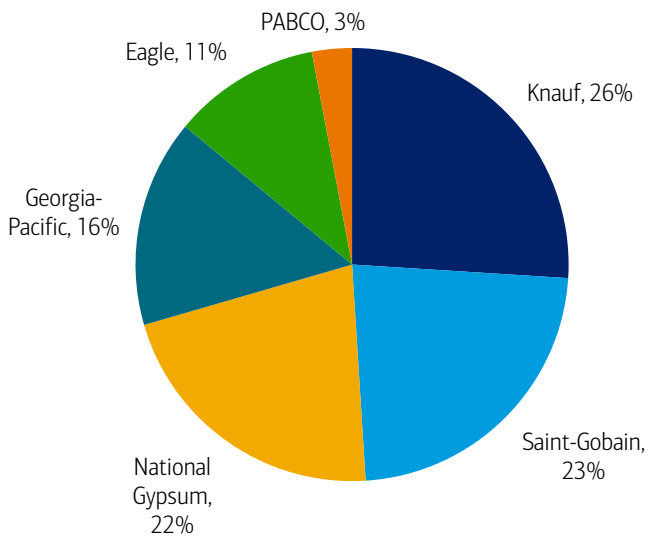
Estimated \$ CPH	\$4,337
Estimated market size	\$6.3bn
Concentration	Semi-consolidated
Primary end-market	Repair & remodel; New construction
Key raw material inputs	Gypsum rock, synthetic gypsum, paper, OCC, natural gas
Major market participants	USG, National Gypsum, Georgia-Pacific

Source: BofA Global Research estimates, Gypsum Association

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Exhibit 51: Estimated US wallboard market share

USG is the individual market leader within the US wallboard market

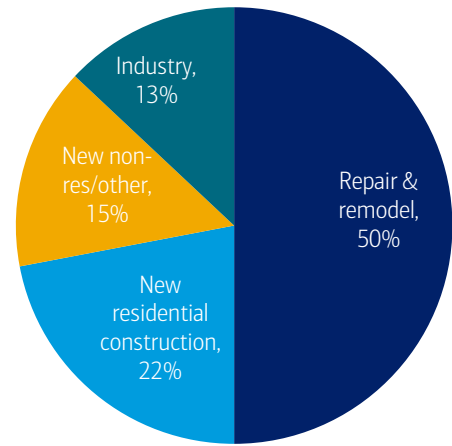


Source: BofA Global Research estimates, USG, CBPX, EXP

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Exhibit 52: Estimated wallboard demand by end-market

R&R comprises nearly 50% of wallboard demand by end-market



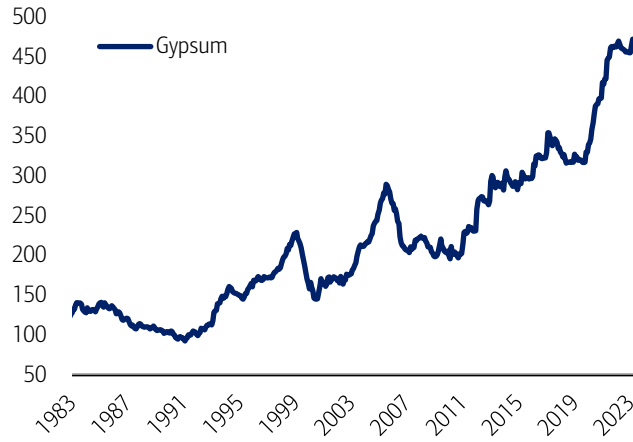
Source: BofA Global Research estimates, Saint-Gobain

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Exhibit 53: Gypsum raw material input price index (PPI)

Prices down (1.6%) YoY in December 2023 (vs. +16% YoY in December 2022)



Source: Bureau of Labor Statistics

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Wallboard trends:

Wallboard volumes have come down from record levels reflecting a modest slowdown in residential construction, while prices were slightly higher in 2023. In early 2024, wallboard volumes have started to recover and manufacturers announced price increases, although we are skeptical that these increases will see significant realization with slowing starts/permits.

Population growth and the timing of new housing permits are key driver of demand for gypsum wallboard. In CBO’s projections, the U.S. population will increase from 342 million people in 2024 to 383 million people in 2054. Building permits in the United States fell to 1.39 million in May of 2024 due to subdued housing demand amid higher interest rates and rising consumer prices.

Over the long term, we expect continued growth in the residential market driven by favorable demographics, notably millennials entering into the housing market, an undersupply of homes and the ongoing shift in population from urban areas to the suburbs.

Appliances

We estimate the North American household appliances market at roughly \$40.8bn in 2023, with demand primarily driven by repair and remodel activity (60% replacement, 25% discretionary) and the remainder driven by new housing (15%). The NA appliances industry continues to consolidate, although Samsung and LG have quickly encroached on the market share of the two established players, Whirlpool and GE Appliances (owned by Haier). Electrolux has held about 10-12% share over the last few years, and other brands now only comprise a small fraction of the market.

Samsung and LG first entered the US market in the mid-2000s and have taken share by targeting the mid/high end consumer and undercutting the incumbent brands on price. WHR fought back over nearly a decade with a series of anti-dumping cases that ended successfully with tariffs being placed on LG/Samsung washing machines over a three year period. In response the Korean manufacturers accelerated the rollout of US production for washers, thus mitigating the tariff disadvantage.

The appliance market stagnated following the Great Recession (-1% avg. growth from 2010-12) but accelerated from 2013-17 (6% avg. growth) as housing strengthened and pent up demand materialized. However, growth slowed to -1% over 2018 & 2019 as the replacement cycle became unfavorable and pricing surged. During the pandemic in 2020 & 2021, demand and pricing both increased materially as US homeowners spent more time at home—resulting in higher appliance usage and an acceleration of the replacement cycle—and used excess savings from stimulus payments to make home improvements. Industry shipments fell 3% YoY in 2022 and 9% YoY in 2023, as we lapped the pull forward in demand during COVID. We expect shipments to be down again in 2024, as discretionary and home-turnover demand as dried up.

Exhibit 54: Appliances

Appliances are a semi-consolidated market with an estimated \$ CPH of \$2,535

Estimated \$ CPH	\$2,535
Estimated market size	\$40.8bn
Concentration	Semi-consolidated
Primary end-market	Repair & remodel
Key raw material inputs	Steel, plastics
Major market participants	Whirlpool, Haier (GE Appliances), Samsung, LG, Electrolux

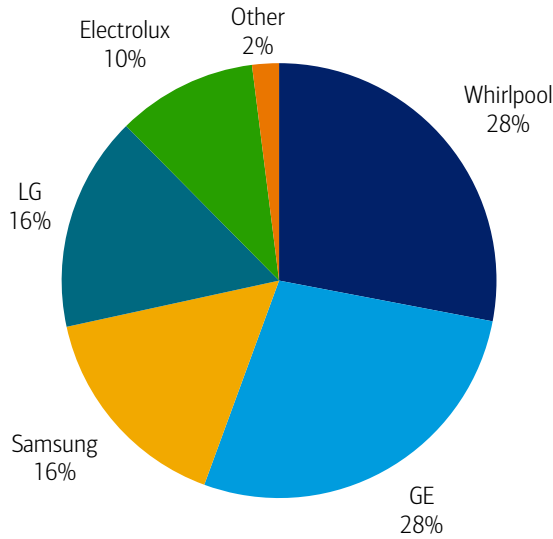
Source: BofA Global Research estimates; WHR

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Exhibit 55: North American appliances market share

Whirlpool and GE are the market leaders in the NA appliances market

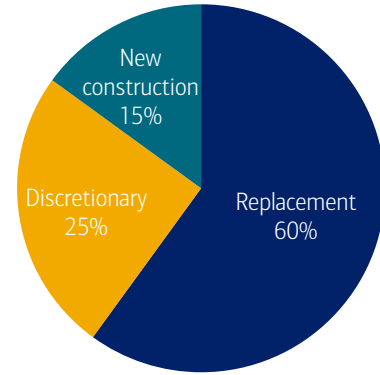


Source: BofA Global Research estimates, Company reports

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Exhibit 56: Estimated North America appliances demand by end-market

Replacement comprises approximately 60% of NA appliances demand by end-market

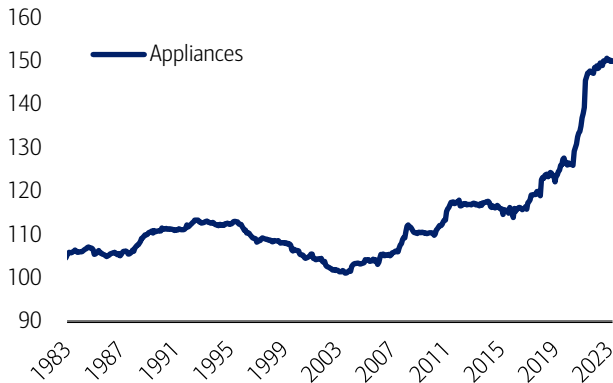


Source: BofA Global Research estimates, Company reports

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Exhibit 57: Appliances raw material input price index

Raw material costs for appliance (mostly steel and resins) have been on a steep rise since 2017 and up 1.2% in December 2023



Source: Bureau of Labor Statistics

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Appliance trends:

Industry shipments were down 6% YoY in 1Q24 driven by a significant decrease in discretionary demand. Lower existing home turnover continues to pressure sales and consumers are limited add-on features when replacing broken items. Most of the volume is centered around promotional periods and promotional pricing has normalized to pre-COVID levels, weighing on pricing and margins.

Architectural Coatings

We estimate the US architectural coatings market at roughly \$19.6bn, with the largest portion of demand attributable to the residential repair and remodel market. The US coatings industry is consolidated with the three largest market participants, Sherwin-Williams, PPG, and Masco, constituting around 79% market share. Paint tends to have relatively low capital intensity, with producers earning high margins and returns.

DIY customers and contractors differ materially regarding channel presence, with DIY customers particularly active in the home center channel, while contractors are more active in company-owned paint stores. Both the DIY and professional are large categories, but there is a clear longer-term trend of market share shifting from DIY to the professional category. However, DIY had a reboot early on in the pandemic as people spent more time at home. According to Sherwin Williams 2023 Investor Overview, 35-40% of the Architectural Paint Industry is DIY (vs 39% in 2022 presentation) and 30-35% is Pro Residential Repaint (vs 32% in 2022 presentation).



Exhibit 58: Architectural coatings

Architectural coatings are a consolidated market with an estimated \$ CPH of \$2,591

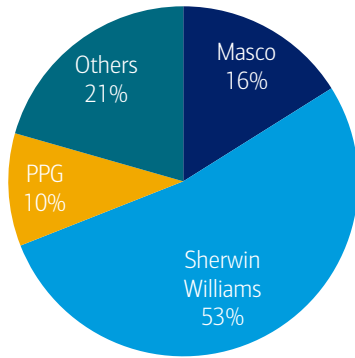
Estimated \$ CPH	\$2,591
Estimated market size	\$19.6bn
Concentration	Consolidated
Primary end-market	Repair & remodel
Key raw material inputs	TiO2, resins/latex (crude oil derivatives)
Major market participants	Sherwin Williams, PPG, Masco

Source: BofA Global Research estimates; SHW, PPG, MAS

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Exhibit 59: US architectural coatings market share

Sherwin Williams is the individual market leader in US architectural coatings

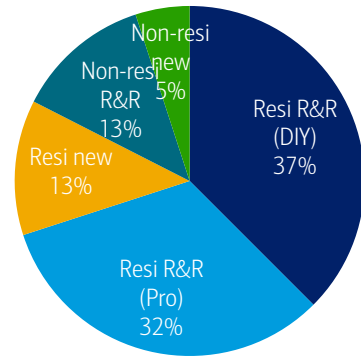


Source: BofA Global Research estimates, company reports

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Exhibit 60: US architectural coatings demand by end-market

Resi R&R DIY comprises 37% of US architectural coatings demand by end-market

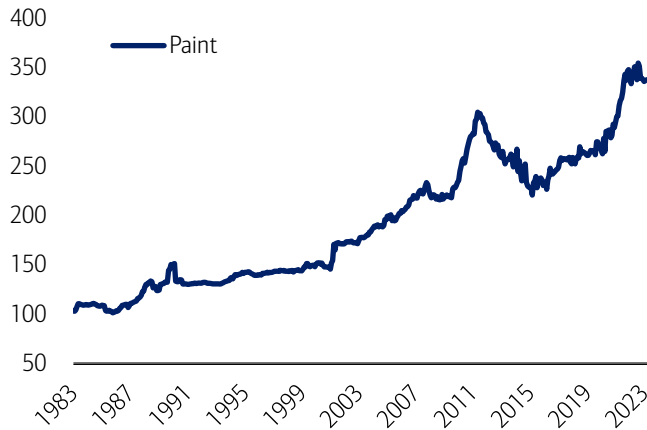


Source: BofA Global Research, SHW

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Exhibit 61: Architectural coatings raw material input price index

Architectural coatings raw material prices remain near all-time highs but down (3.0%) YoY vs. December 2022



Source: Bureau of Labor Statistics

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Architectural coatings trends:

The Non-Residential & Residential square footage has been increasing since the prior peak of 2004. This should drive continued gallon growth to the industry due to larger repaint opportunity. Another trend in the architectural coatings market is growth in the professional segment outpacing DIY growth. Other trends include increasing adoption of digital tools/e-commerce and a strong focus on sustainability (SHW ProMac 200 HP and SuperDeck or PPG with Bio-Based and Comex). Finally, there has been an increased interest in Self-Cleaning coatings /anti-microbial paints since COVID began, such as in PPG (Corining Guardian) and SHW (HGTV Home® by Sherwin-Williams Everlast™ and Valspar products). These paints can be used in public places for the commercial side of the business and in the automotive industry.



Solar Industry: State of play & outlook in 2023

2023 was a tough year for the US residential solar industry, yet it resulted in the segment's fifth consecutive year of record installed capacity. While the passage of the Inflation Reduction Act (IRA) in 2022 is supportive of long-term growth for the segment through the addition and extension of investment tax credits for residential solar systems and battery storage, high interest rates has started to weigh on the sector. This has led to a ripple effect with high financing cost and changes in financing terms leading to lower consumer demand, and more than 100 residential solar dealers and installers in the U.S. declaring bankruptcy in 2023. Of the top ten residential solar installers, seven saw a decline in market share, with notable losses for Tesla, ADT Solar, and Sunrun. ADT Solar exited the market due to operational challenges, while Tesla and Sunrun faced declining deployments and increasingly relied on subcontractors. While many installers report that pricing and financing terms remain steady, delayed milestone payments, permitting and interconnection delays continue to strain cash flows.

That being said, over the next decade, the US residential solar market is projected to add over 100 GWdc of installed capacity and grow at an average annual rate of 5% between 2024 – 2034 (source: Wood Mackenzie). Residential solar demand is driven by rising utility rates, federal and regional incentive schemes, desire for energy independence and resilience (in light of increasing grid outages and extreme weather events), and a push for decarbonization.

Solar Panels & Solar Systems

We estimate the US residential solar panel market at roughly \$2.25bn and the full residential solar system market is roughly \$18bn, including soft costs. The largest portion of residential solar panel demand is attributable to retrofit installations; however, large solar dealers increasingly partner with homebuilders to capture the new homes opportunity.

The residential solar panel market is semi-consolidated with the four largest market participants in 2023 being Hanwha Q CELLS, JA Solar, REC, and Moxeon. Oversupply and enforcement of the Uyghur Forced Labor Prevention Act (UFLPA) reshaped competitive dynamics vs a year ago, with companies like JA Solar and Canadian Solar gaining market share, while LONGi experienced losses. Future year module capacity is dependent upon US federal regulatory proceedings, federal investment tax credit revisions, and local net energy metering (NEM) policies.

Exhibit 62: Solar Panels & Solar Systems

Solar panels & systems are a semi-consolidated market with a CPH of \$2,480 and \$20,650, respectively

Estimated \$ CPH	\$2,480 (Solar Panels) vs. \$20,650 (Solar System)
Estimated market size	\$2.25bn (Solar Panels) vs. \$18.0bn (Solar System)
Concentration	Semi-Consolidated
Primary end-market	Existing Home Retrofit
Key raw material inputs	Semiconductors, polysilicon, glass, aluminum (Solar Panels)
Major market participants	Panasonic, REC, Silfab Solar, Hanwha Q Cells (Solar Panels)

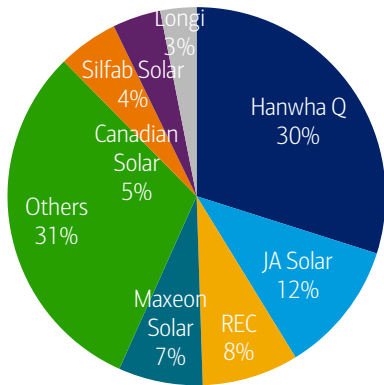
Source: BofA Global Research estimates, Bloomberg, EnergySage

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Exhibit 63: US residential solar panel market share

US residential solar panel market is semi-consolidated with large players accounting for the majority of market share



Source: BofA Global Research estimates, EnergySage

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Solar System End Market Trends:

In the US, retrofit solar panels segment continues to dominate the market as compared to new home builds. This includes Solar PV installation in existing residential properties undergoing renovation work.

Installed solar capacity in Texas, California, Florida, Ohio, Virginia, and Colorado all grew by more than 1GW in 2023, while South Dakota, Ohio, Pennsylvania, West Virginia, and Arkansas doubled their installed solar capacity.

California was once upon a time America’s top solar market for over a decade, bolstered by favorable regulation. California legislation issued in 2018 mandated that all new single-family homes and multi-family homes up to three stories high must include solar beginning in 2020. However, California’s third iteration of net metering (NEM 3.0), which went into effect in April 2023, has significantly reduced net metering compensation rates for new California solar customers (by about 75% according to Energy Sage), adversely impacting consumer demand. California saw a ~35% quarterly drop in capacity in 4Q’23 as installers depleted backlogs of sales made under NEM 2.0.

Overall, Wood Mackenzie still forecasts a 13% contraction for the residential solar market in 2024, as installation volumes reflect the impacts of high interest rates and California’s net billing transition. In February 2024, Assembly Bill (AB) 2619 was introduced to restore the incentives restored for residents who generate clean power for the grid. AB 2619 now awaits assignment to a policy committee in the State Assembly.

On the contrary, residential solar-plus-storage is witnessing growth, with deployments increasing 13% in 2022 as compared to 2021 and approximately 106,000 projects installed. California has become particularly attractive due to changes in solar net metering policies, encouraging consumers to pair batteries with existing PV systems. In fact, battery attachment rates spiked from ~10% to ~60% post NEM 3.0.

Solar Panel Costs: It’s trending lower...

We highlight that solar panels are one of many components on a residential solar system, which also include inverters, electrical balance of systems, racking, and optional additions of energy storage, generators, load managers, and EV chargers. On an average, a household requires an average of 19 panels for electricity needs, which translates to 7-10 kW system. The National Renewable Energy Laboratory (NREL) estimates that the cost for residential PV declined to \$2.68/Wdc in 2023 from \$3.18/Wdc in 2022, reflecting the impact of Inflation Reduction Act (IRA) tax incentives.

The prices of residential solar panels have dropped over 50% over the past decade, with the average cost of rooftop solar system now being in the range of \$25,000 as compared to \$50,000 a decade ago. The decline can be attributed to multiple factors which include lower material costs, gains on the installation side, efficiency in labor and permitting process. Going forward, prices are expected to drop further as the solar industry continues to develop driven by federal solar tax credit being in place at over the next decade. In 2023, module prices steeply declined as oversupply was driven by slowdown in residential solar deployments and increasing module imports. Meanwhile, labor, engineering and equipment component costs have risen due to rise in inflation.



Fiberglass Insulation

We estimate the US fiberglass insulation market at roughly \$4.1bn, with the largest portion of demand attributable to new residential construction. The fiberglass insulation industry is consolidated with the three largest market participants, Owens Corning, CertainTeed (a division of Saint-Gobain) and Knauf commanding roughly 77% of the market. Insulation tends to be capital intensive, considering the process of melting glass into strands and the need for continuously running furnaces.

According to the OC 2023 investor relations roadshow deck, the global insulation revenue is approximately 37.5% exposed to residential construction, 50% to commercial and other construction materials and 12.5% to industrial and other. Around 2/3 of the market is non-residential.

Exhibit 64: Fiberglass insulation

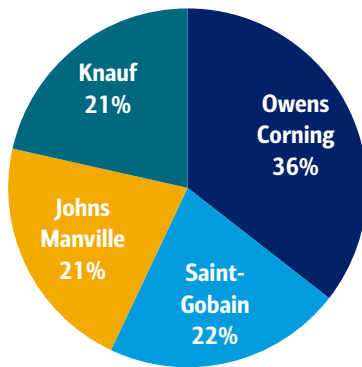
Fiberglass insulation is a consolidated market with an estimated \$ CPH of \$1,512

Estimated \$ CPH	\$1,512
Estimated market size	\$4.1bn
Concentration	Consolidated
Primary end-market	New construction
Key raw material inputs	Fiberglass, natural gas
Major market participants	Owens Corning, Saint-Gobain, Knauf, Johns Manville

Source: BofA Global Research estimates, OC

Exhibit 65: Estimated US fiberglass insulation market share

Owens Corning is the individual market leader within US fiberglass insulation



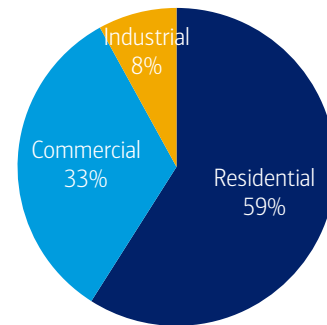
Source: OC

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Exhibit 66: insulation revenue end-market

Insulation slightly more weighted to residential vs. commercial/industrial



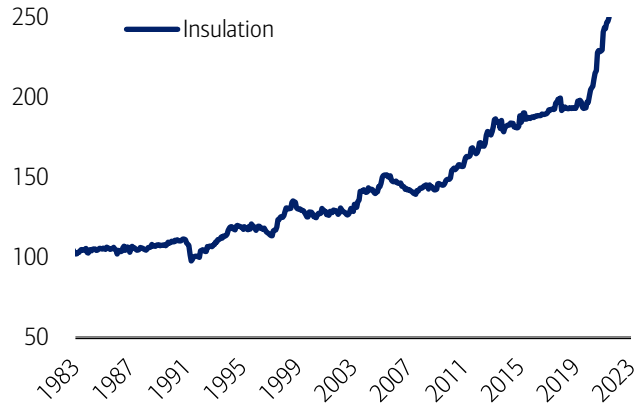
Source: OC

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Exhibit 67: Insulation raw material input price index (PPI)

Insulation raw material prices rose 1.2% y/y in December 2023



Source: Bureau of Labor Statistics

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Spray-foam insulation

We estimate the US spray-foam insulation market at roughly \$0.615bn, or ~15% of the US insulation market. Insulation foam demand is broadly split 50/50 between resi and non-resi markets, though spray-foam applications favor the former. Of the demand from residential construction, roughly 70% originates from new builds, with the product skewing to higher value homes. The market is increasingly consolidated following Huntsman's acquisitions of Demilec and Icynene-Lapolla. These deals have put Huntsman in the industry leading position, at ~30% market share (the top 5 control 65-70% of the market). Owens Corning also acquired Natural Polymers and introduced Ultra-Pure Spray foam. The spray-foam market is not particularly capital intensive, but the installation cost comes at a premium to traditional fiberglass markets. This premium has been shrinking more recently, as spray foam prices decline. This could create a more favorable backdrop for adoption, particularly given the superior insulation performance, with a current payback period of <3 years to fiberglass at current market prices.

Insulation trends:

Demand for sustainable solutions continues to be a trend in the US and abroad, positively impacting the insulation market. 90% of buildings in US and 75% in the EU are under insulated. Properly insulated homes payback upfront costs in less than 90 days driven by the amount of energy saved. An additional 270mm lbs./year of insulation is needed if all US states adopted the 2021 IECC. Other trends include stricter codes for thermal, moisture, air/ vapor barrier, fire and acoustics. Demand for insulation is driven by single-family housing, which typically uses 2.0-2.5x the amount of insulation per start vs a multi-family unit. Rebates in the Inflation Reduction Act for energy efficiency are driving additional demand for insulation from homebuilders.

Supply remains tight, as most manufacturers are on allocation, and industry was relatively unchanged over the last few years. Johns Manville estimates that net all of the capacity changes, the industry is short 7-8K trucks of Batts. Knauf is adding a new plant in the next 60-90 days, but this is only expected to get the industry capacity back to where it was 1.5 years ago. Manufacturers have announced 2 price increases in 2024 and are seeing strong realization, with the potential for another price increase in late 2024.

Exhibit 68: Spray-foam insulation

Spray-foam insulation is now roughly 15% of US insulation market

Estimated \$ CPH: 3,400

Estimates Market size: \$0.615bn

Concentration: Moderately Consolidated

Primary end-market: New construction

Key raw material inputs: mdi isocyanates (methanol, chlorine, benzene) and polyols (propylene oxide)

Major market participants: Huntsman, Carlisle, BASF, Firestone, SWD Urethane, Johns Manville

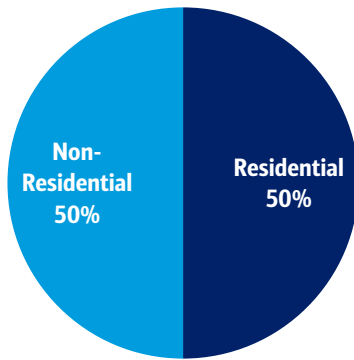
Source: BofA Global Research

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Exhibit 69: Spray Foam Insulation by end market

In residential construction, roughly 70% originates from new builds



Source: BofA Global Research

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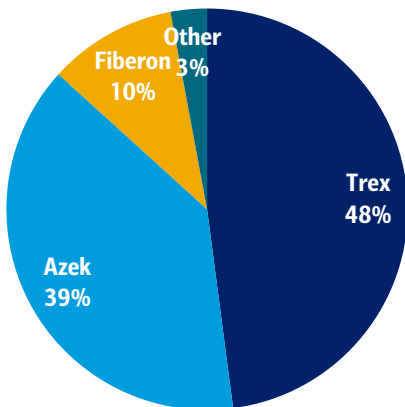
Composite decking

We estimate the US decking and railing industry at roughly \$8bn, with composites accounting for 25% of the market (in 2022, latest data point). The industry is consolidated with the three largest market participants, Trex, Azek and Fiberon commanding roughly 95% of the market. Deckorators controls most of the remaining market, resulting in nearly 100% share among four players.

We estimate pro dealers account for 70% of the composite decking end market and retail (Home Depot & Lowe's) accounts for the remaining 30%. Decking manufacturers sell their product through distributors that typically operate with a dual-distributor model by market.

Exhibit 70: Estimated US Composite decking market share

TREX accounts for ~48% of US composite decking market share

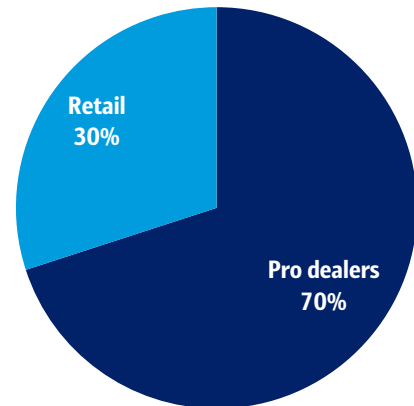


Source: BofA Global Research, company reports

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Exhibit 71: Estimated Composite decking demand by end-market

Pro dealers account for approximately 70% of composite decking demand by end-market, with retail accounting for the remaining 30%



Source: BofA Global Research, company reports

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Composite decking trends:

Similar to other outdoor living products, demand for composite decking accelerated significantly post-COVID-19. Although there has been a recent moderation, we forecast composite decking to grow at a high-single digit CAGR through 2035 consisting of mid-single digit market growth and an annual conversion rate of 100-200bps from wood decks to composites. While the conversion from wood products to alternative materials (composite and PVC) is not new, we expect the trend to continue. We believe composites will reach 45-50% of the industry driven by consumer preference for products that: (1) are more durable and longer lasting, (2) are environmentally friendly, and (3) require less maintenance and upkeep costs. In 2023, manufacturer sales trends were choppy due to inventory destocking/restocking, but sell-out trends remained strong. We expect sell-out to increase mid-single digits in 2024 vs. a flat-to-down R&R market.

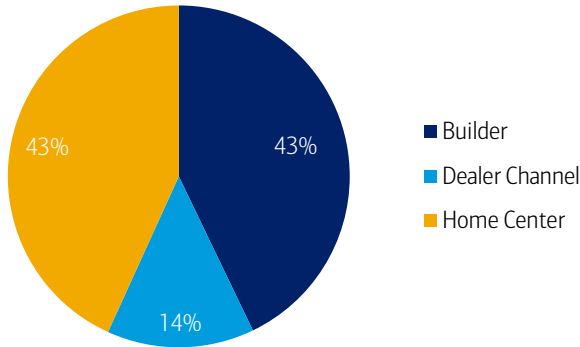


Building product company snapshots

American Woodmark (AMWD)

Exhibit 72: AMWD/RSI revenue by distribution channel

Home centers account for 43% of AMWD revenue by distribution channel



Source: Company filings; BofA Global Research

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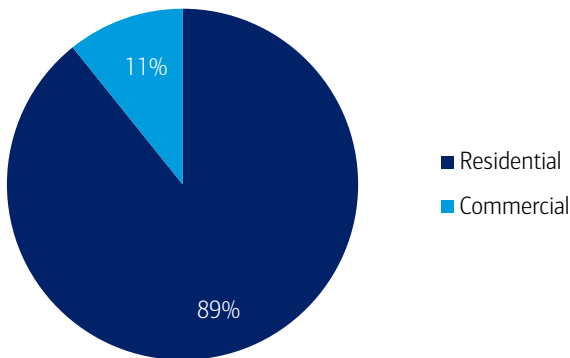
Cabinet revenue by distribution channel:

American Woodmark manufactures and distributes various types of cabinetry and vanities for kitchens and other parts of the home, under the American Woodmark, Professional cabinet solutions, Allen + roth, Hampton Bay, Timberlake, Shenandoah, 1951 cabinetry, SageHouse, and Waypoint living spaces brands. We estimate the combined AMWD/RSI company has US market share of roughly 16%, making it the industry’s second or third largest player (as of 2023). In the company’s most recent filings, home centers and builders have accounted for approximately 43% each of the company’s sales, and dealers representing 14% of sales. American Woodmark’s top competitors are Masterbrand and Cabinetworks.

Azek (AZEK)

Exhibit 73: Revenue by segment

89% of revenues were derived from Azek’s Residential segment in 2023



Source: AZEK

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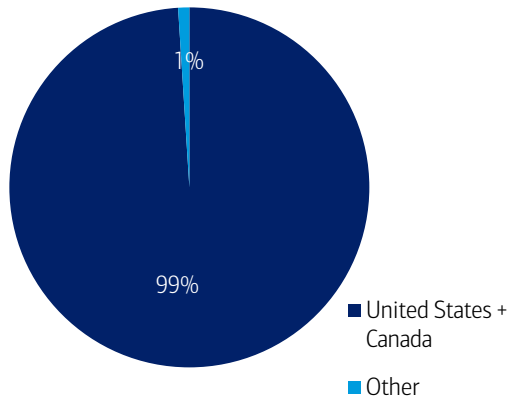
Segment:

Azek operates in two segments: Commercial and Residential. Products sold by Azek’s Commercial segment include highly engineered polymer materials and low-maintenance bathroom partitions, shower and dressing stalls, lockers and other storage solutions. The Commercial segment includes the Vycom and Scranton Products product lines. In November 2023, AZEK sold the Vycom business. Azek’s Residential segment serves the high-growth Outdoor Living market by offering products that inspire consumers to design outdoor spaces tailored to their individual lifestyles and is driven by R&R activity (80%). The Residential segment consists of Deck, Rail & Accessories which is approximately 62% of total consolidated net sales and Exteriors which is approximately 27%. As of 2023, approximately 89% of Azek’s total revenues were derived from Residential, while 11% of total revenues were derived from Commercial.



Exhibit 74: Gross sale by geography

Almost all (99%) of Azek’s 2023 gross sales came from the United States and Canada.



Source: AZEK

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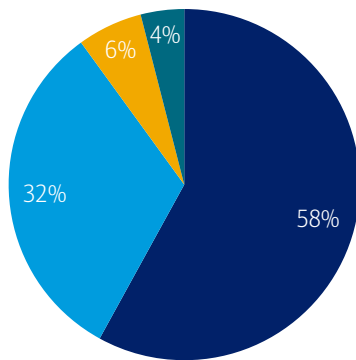
Geography:

Virtually all of Azek’s 2023 gross sales were derived from the United States and Canada. Within the Residential segment, they sell products through a network of more than 10,000 professional dealer and lumber locations and home improvement retail outlets, including both stocking and special order locations. These outlets are served by approximately 40 distributors with over 170 branch locations. The Commercial segment sells its products through a widespread distribution network, as well as directly to OEMs. Distributors in locations outside of the United States and Canada are responsible for marketing and selling.

Boise Cascade (BCC)

Exhibit 75: Wood products revenue by product

EWP and Plywood account for approximately 90% of BCC wood revenue in 2023



Source: Company filings

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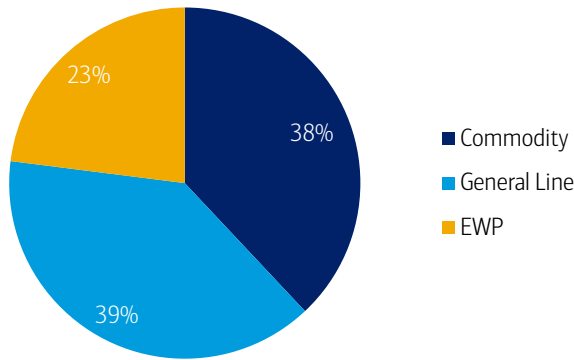
Wood Products:

The Wood Products segment accounted for 24% of 2023 sales and manufactures laminated veneer lumber (LVL), I-joists, and laminated beams, which are collectively referred to as EWP. EWP represents 58% of BCC wood products revenues. Boise Cascade is one of the largest producers of engineered wood products and plywood in North America and a leading U.S. wholesale distributor of building products. Georgia-Pacific is the largest producer of plywood and the top competitors in EWP include Weyerhaeuser and Louisiana-Pacific.



Exhibit 76: Building Materials Distribution revenue by product

Commodities account for approximately 38% of BCC distribution revenue in 2023



Source: Company filings

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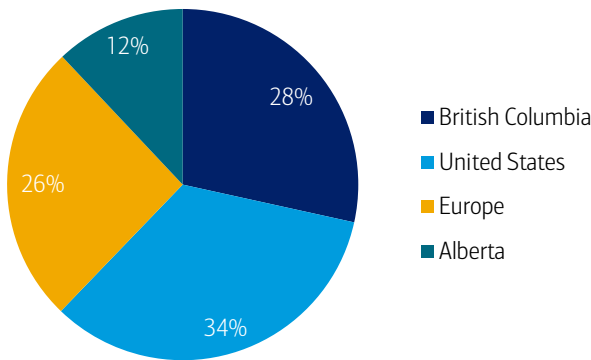
Building Materials Distribution:

The Building Materials Distribution segment sells a wide range of commodity and general line products as well as engineered wood products (EWP). Commodity products include plywood, oriented strand board (OSB), framing lumber, boards and treated products, while general line products include siding, composite decking, doors and millwork, insulation, roofing and metal products. Other than plywood and EWP, BCC sources most of the building materials sold in this business from third-party suppliers. The company has 40 distribution centers across the US.

Canfor Corp. (CFP)

Exhibit 77: Lumber segment capacity by region

74% of CFP's lumber capacity came from the U.S. and Canada



Source: Company presentations

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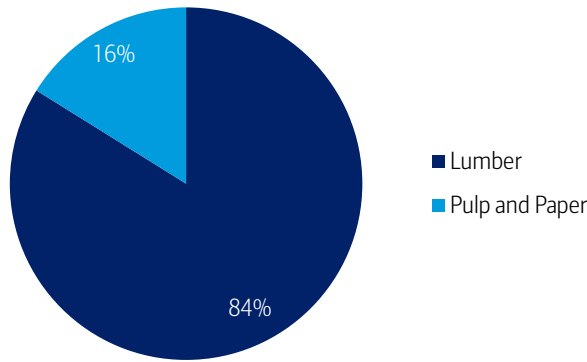
Lumber:

The Lumber segment accounted for 84% of consolidated sales in 2023. Overall, Canfor's manufacturing operations include over 50 facilities with 6.7 BBF annual capacity and CFP is the world's largest softwood lumber producer. The company's largest competitors in lumber include Weyerhaeuser, West Fraser, and Smurfit Kappa Group Plc.



Exhibit 78: Sales by segment

84% of sales came from lumber in 2023



Source: Company presentations

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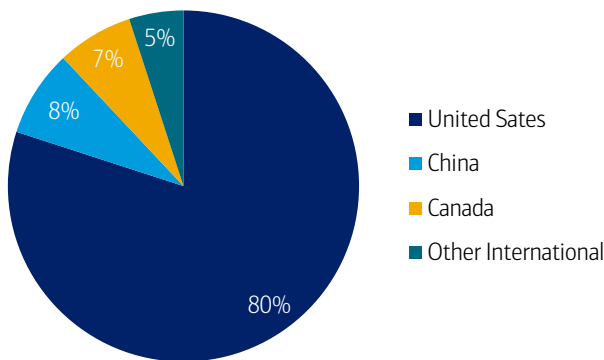
Pulp & Paper:

The Pulp & Paper segment accounted for 16% of consolidated sales in 2023, with the majority from pulp. Canfor has about 2% of global market pulp capacity, with 1.1mn metric tons (MT) of northern bleached softwood kraft (NBSK) pulp capacity and 230k MT of Bleached Chemi-ThermoMechanical pulp (BCTMP) capacity. This segment also includes 140k MT of bleached and unbleached kraft paper capacity.

Fortune Brands Innovations (FBIN)

Exhibit 79: Geography by sales

United States account for 80% of FBIN sales



Source: Company filings

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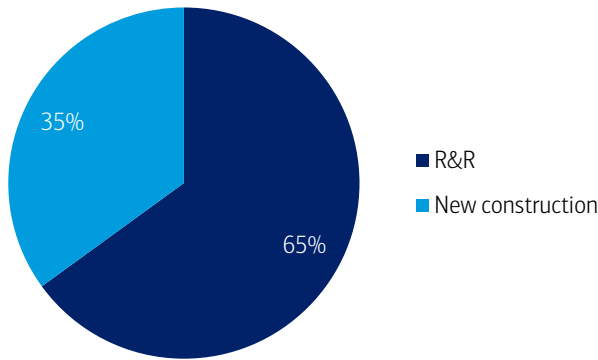
Plumbing:

The Plumbing segment manufactures faucets, sinks and waste disposals under the Moen, Riobel, ROHL, Perrin & Rowe, Victoria & Albert, Shaws and Waste King brands in North America and China. The Plumbing segment accounted for roughly 55% of consolidated sales in 2023, 28% of which were international. FBHS believes it commands the top position in North America with approximately 32% share of its addressable market. In 2023, The Home Depot and Lowe’s accounted for approximately 18% of FBIN’ net sales in the Water segment. Top competitors in plumbing include Masco, Kohler, LIXIL Group, InSinkErator (owned by Whirlpool), Huida, Hgill, and Jomoo and imported private-label brands. In 2023, the Plumbing sector change its name to Water Innovations.



Exhibit 80: NA Business Mix by End Market

R&R comprises approximately 65% of FBIN demand by end-market



Source: Company filings

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Outdoors:

In 2023, following the spinoff of the cabinets business, FBIN separated the Outdoors & Security segment in to 2 segments. The Outdoors segment manufactures fiberglass and steel entry doors under the Therma-Tru brand and storm, screen and security doors under the Larson brand. The segment also includes urethane millwork (Fypon) and decking, railing and cladding (Fiberon). The Outdoors segment accounted for roughly 29% of consolidated sales in 2023. In 2023, The Home Depot and Lowe’s accounted for approximately 29% of net sales for the outdoors segment. Therma-Tru, Larson, Fiberon, Fypon and Solar Innovations brands compete with Masonite, JELD-WEN, Andersen, Trex, Azek, Plastpro, Pella, and various regional and local suppliers.

Security:

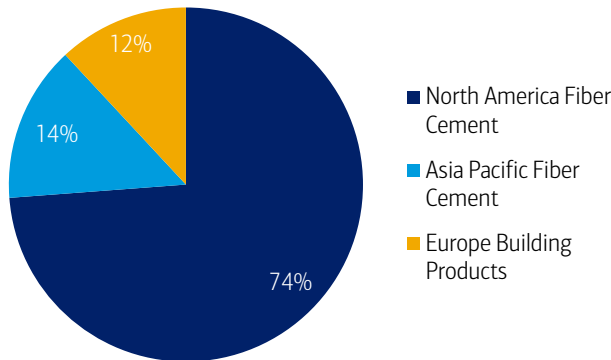
The security segment manufactures safety and Security devices sold under the Master Lock, American Lock brands and SentrySafe brand. The Security segment accounted for roughly 16% of consolidated sales in 2023. In 2023, The Home Depot and Lowe’s accounted for approximately 17% of net sales. Master Lock, American Lock, Yale and August compete with Abus, W.H. Brady, Hampton, Kwikset, Schlage and various imports, and SentrySafe competes with First Alert, Magnum, Fortress, Stack-On and Fire King.



James Hardie Industries (JHX)

Exhibit 81: JHX FY23 sales by region

74% of JHX's 2023 sales came from North America



Source: BBG

Note: Qs are corrected to match the rest of the companies

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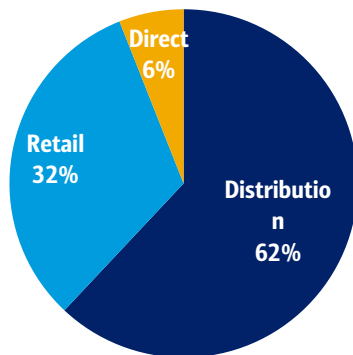
Fiber cement siding:

James Hardie is the largest manufacturer of fiber cement siding, which is primarily used in both residential new construction and repair and remodel activity. The company derives roughly 74% of sales from North America and are approximately 65% Repair & Remodel. In North America, c. 80% of sales came from the high value products (i.e Hardie exteriors and Hardie exteriors with ColorPlus). Top competitors in North American siding include Louisiana Pacific and Ply-Gem (vinyl).

JELD-WEN Holding (JELD)

Exhibit 82: Sales by Channel

Distribution represents 62% of sales by channel



Source: BofA Global Research estimates, company reports

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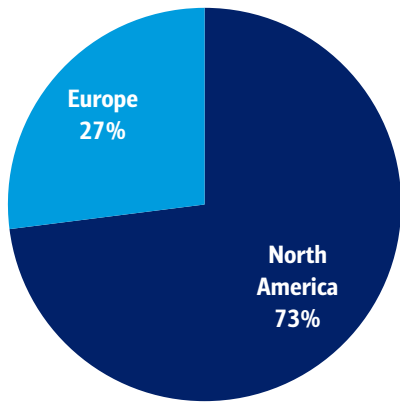
Company:

The JELD-WEN Holding (JELD) company sells primarily into the North American market, which accounted for roughly 73% of 2023 consolidated sales and Europe represented 27%. In July 2023, JELD completed the sale of their Australasia business. In terms of channel mix, JELD sales are 62% distribution, 32% retail and 6% direct. JELD's construction application is 46% Residential New Construction, 43% R&R and 11% Non-residential. Top brands include JELD-WEN, CraftMaster, La Cantina and Karona. Home Depot, a customer of JELD's North America segment, represented 15% of consolidated net revenue in 2023.



Exhibit 83: Sales by Geography

North America accounts for 73% of JELD’s sales



Source: BofA Global Research estimates, company filings

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Segments:

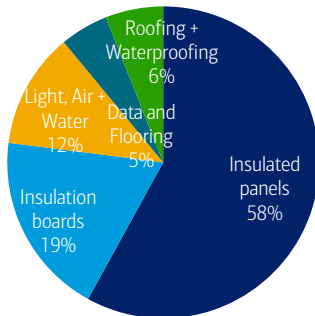
In terms of channel mix, North America sales account for 73% of JELD’s revenue. The segment competes primarily in the market for residential doors and windows in the U.S. and Canada. They offer a full line of interior and exterior door and window products. Due to seasonality the second and third quarter volumes are usually higher. In North America home center customers include, among others, The Home Depot, Lowe’s, and Menard. Top competitors include Masonite, Therma-Tru (FBIN), Andersen, Pella, Ply-Gem and Milgard (a division of MI Windows and Doors).

JELD’s non-residential door product offering is concentrated in the European segment and sells primarily into Germany, Austria, Switzerland, and Scandinavia, as well as France and the U.K. and accounted for roughly 27% of 2023 consolidated sales. Top brands in Europe include Swedoor, DANA, Dooria, Domoferm, Mattioli, Zargag and Alupan. Top competitors include Masonite, Huga, Prum/Garant, Viljandi, Masonite, Keyor, and Herholz.

Kingspan (KSP)

Exhibit 84: Kingspan – Revenue split by division

Insulated panels followed by insulation boards account for 77% of revenue



Source: BofA Global Research estimates, company filings

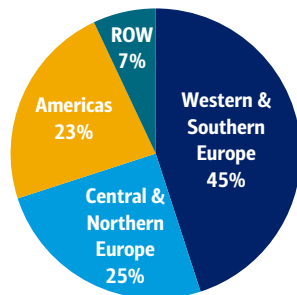
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Divisional exposure:

Kingspan is a global leader in high performance insulation and building envelop solutions that improve the performance of buildings and improve construction methods. It generates 58% of revenue from its market leading Insulated Panels division. Its associated Insulation Boards business accounts for an additional 19% of sales. Light, Air and Water accounts for 12%, Roofing and Waterproofing account for 6%, and Data and Flooring account for 5%.

Exhibit 85: Exhibit 21: Kingspan – Revenue split by geography

Western & Southern Europe account for 45% of total revenue



Source: BofA Global Research estimates, company filings

BofA GLOBAL RESEARCH

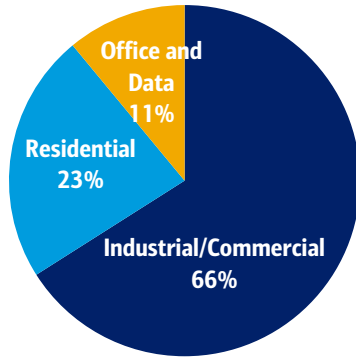
Geographic exposure:

Kingspan has 224 manufacturing facilities globally. 45% of its revenue came from Western & Southern Europe, which is predominantly France, Benelux, the UK and Germany, while 25% came from sales in Central & Northern Europe. The remaining 23% comes mainly from the Americas. Finally, a relatively small 7% comes from the rest of the world.



Exhibit 86: Exhibit 22: Kingspan - Revenue split by sector

Industrial and Commercial represent the company biggest revenue by sector (66%)



Source: BofA Global Research estimates

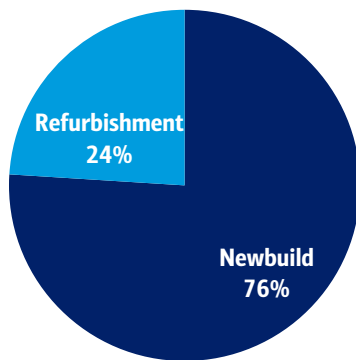
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Sector exposure:

The company generates 66% of its overall demand from commercial and industrial applications, 11% from offices and data, and the remaining 23% from residential. Residential exposure has declined from 25% in 2009.

Exhibit 87: Kingspan – End market exposure

New Build is Kingspan predominant end market (76%)



Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

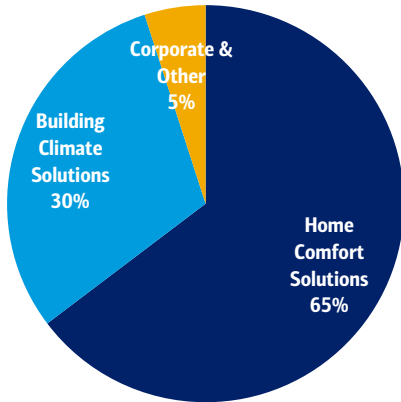
End market exposure:

Kingspan’s end market exposure is driven by its route to market, which is dictated by the role of the architect. This implies that its products are often ‘designed in’ to a building at a very early stage resulting in an end market for its products that is predominately ‘new build’. Approximately 76% of its sales fall into this category, with the other 24% used in refurbishment applications.

Lennox International, Inc. (LII)

Exhibit 88: Revenue by segment

Home Comfort/Residential segment accounts for 65% of 2023 sales



Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

Segments:

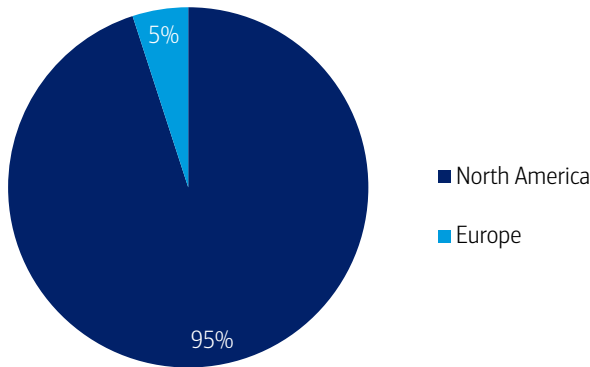
Lennox International is an industry leader in climate control products for HVAC. The Home Comfort Solutions segment, which sells primarily in the United States and Canada, provides home heating and cooling equipment for the residential replacement and new construction markets. This segment accounted for roughly 65% of 2023 consolidated sales.

The Building Climate segment, which sells primarily into North America, provides indoor comfort solutions and services plus refrigeration systems for office buildings, schools, supermarkets restaurants, retail establishments, and other light commercial applications in North America. This segment accounted for roughly 30% of 2023 consolidated sales.

The Corporate & Other segment included the results of European operations and products and accounted for roughly 5% of 2023 consolidated sales.

Exhibit 89: Revenue by geography

North America accounts for 95% of LII's sales



Source: BofA Global Research estimates, company filings

BofA GLOBAL RESEARCH

Geography:

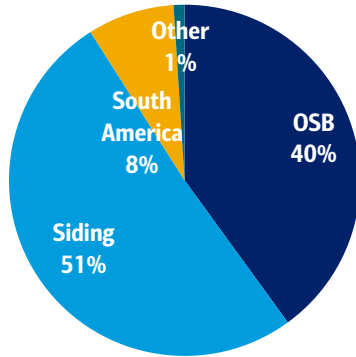
North America accounted for roughly 95% of 2023 consolidated revenues, while Europe accounted for approximately 5%.



Louisiana-Pacific (LPX)

Exhibit 90: Sales by segment

The Siding segment accounted for roughly 51% of 2023 consolidated sales.



Source: BofA Global Research estimates, company filings

Note: Revenue by segment adds up to more than 100% due to eliminations

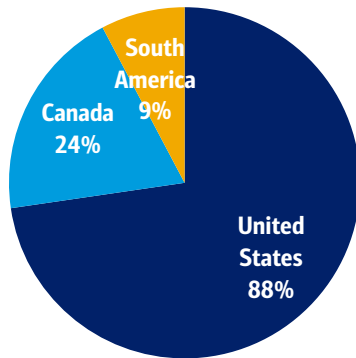
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Segment:

The Siding segment accounted for roughly 51% of 2023 sales. Additionally, The OSB segment accounted for roughly 40% of 2023 consolidated sales, while the South America segment accounted for 8% of sales. Other segments account for the remaining 1% of sales. LPX is growing sales of value-added OSB (flooring, flame retardant), which tends to command a higher price point and is somewhat less volatile than commodity OSB. Top competitors in OSB include West Fraser, Georgia-Pacific and Weyerhaeuser.

Exhibit 91: Sales by geography

LPX generates 97% of its sales in North America



Source: BofA Global Research estimates, company filings

Note: Revenue by geography adds up to more than 100% due to intercompany sales

BofA GLOBAL RESEARCH

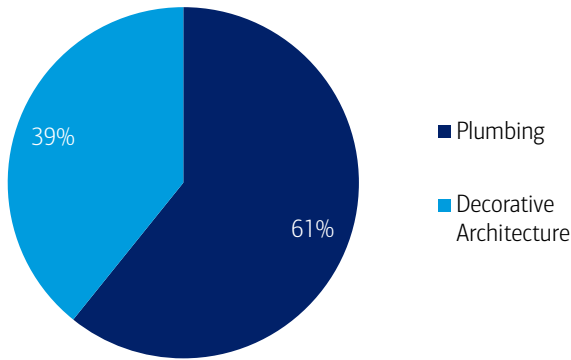
Geography:

The United States accounted for roughly 88% of 2023 consolidated revenues, while Canada accounted for approximately 24% of 2023 revenues. Furthermore, South America accounted for the remaining 9% of total revenues for 2023.

Masco Corp (MAS)

Exhibit 92: Sales by segment

Plumbing accounted for roughly 61% of consolidated sales in 2023



Source: BofA Global Research estimates, company filings

BofA GLOBAL RESEARCH

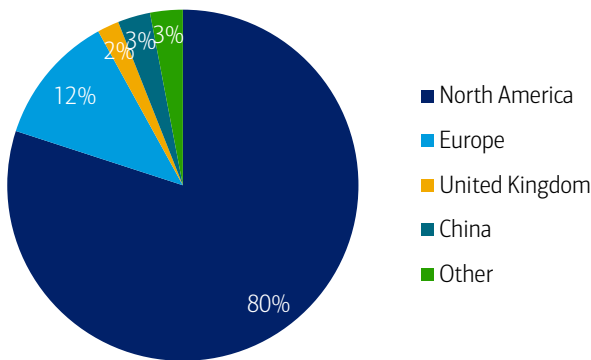
Segment:

MAS operates two segments: Plumbing and Decorative Architectural. Plumbing sources and manufactures faucets and bathing/showering devices, primarily under the Delta (Peerless, Delta, Brizo) and Hansgrohe (Axor, Hansgrohe) brands in North America, Europe and Asia. In addition, MAS offers spas, exercise pools and rough plumbing systems. Plumbing accounted for roughly 61% of consolidated sales in 2023. Top competitors in plumbing include Fortune Brands (Moen), Kohler and LIXIL Group.

Decorative Architectural products produces coatings under the BEHR and KILZ brands in North America. In addition, this segment houses MAS's Liberty Hardware unit and Kichler Lighting. Decorative Architecture accounted for roughly 39% of total sales in 2023. Top competitors include Sherwin Williams/Valspar, PPG and Benjamin Moore.

Exhibit 93: Sales by geography

North America remains MAS's primary geographic region



Source: BofA Global Research estimates, company filings

BofA GLOBAL RESEARCH

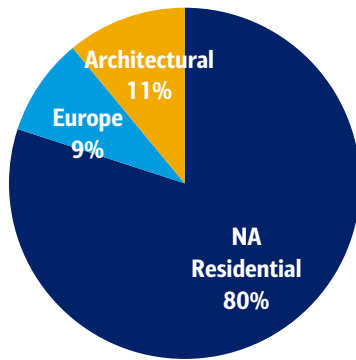
Geography:

MAS's revenue base is split geographically between North America and International regions, with North America accounting for 80% of 2023 sales and international regions accounting for 20% of 2023 sales (Europe represents 12% of the int'l sales).



Masonite International Corp (DOOR)

Exhibit 94: Net Sales by Segment
NA account for 80% of 2023 sales



Source: DOOR

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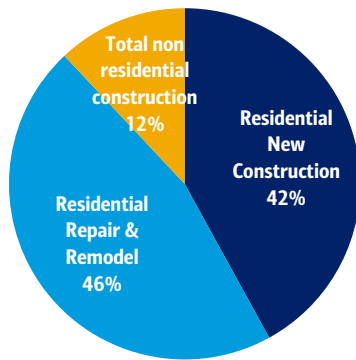
Segments:

The North America Residential segment, which sells primarily into the US and Canada, accounted for roughly 80% of 2023 consolidated sales. As of the end of 2022, the residential repair, renovation and remodeling end market accounted for over half of the net sales for the segment. Top brands in North America include Masonite, Premdor, Belleville and Barrington. Top competitors include JELD, Therma-Tru (FBHS), Feather River and Steves and Sons Inc. On May 15, 2024, OC completed their acquisition of Masonite.

The European segment is a leading provider of interior doors, made from recycled wood fibers, and energy-efficient, durable exterior doors in the United Kingdom market. They also sell door skins (facings) in Western Europe from their manufacturing facility in Ireland. The European segment has a balanced portfolio of consumers across the exterior and interior residential business and accounted for roughly 9% of 2023 consolidated sales. Top brands in Europe include Masonite, Premdor, Crosby, Door-Stop and National Hickman. Top competitors include JELD, Vicaima and Distinction.

The Architectural segment sells primarily into commercial and institutional spaces and accounted for roughly 11% of 2023 consolidated sales. In terms of end-market mix, Architectural sales are divided among Healthcare, Education, Office, Stock and Lodging. Top brands in Architectural include Mohawk, Marshfield, Algoma, Baillargeon and Haring.

Exhibit 95: Revenue by end market
88% Residential



Source: DOOR

BofA GLOBAL RESEARCH

End Market:

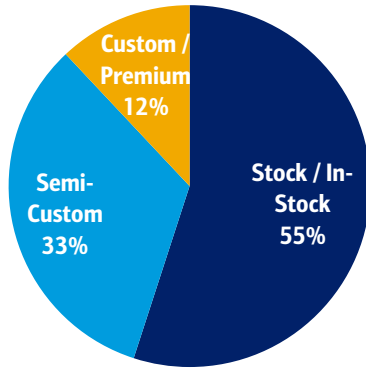
The Masonite International Corp (DOOR) revenue end market is 88% Residential. Residential new construction account for 42% of sales, while Residential Repair & Remodel is 46%. Nonresidential construction represents 12% of sales in 2023.



Masterbrand (MBC)

Exhibit 96: MBC Product portfolio

Stock/In-Stock represent 55% in 2023



Source: MBC

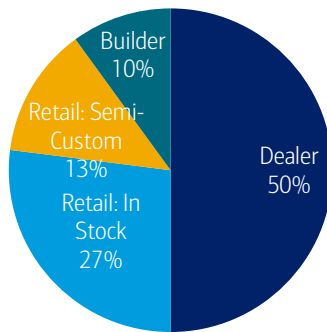
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Brand portfolio:

MasterBrand is the largest manufacturer of residential cabinets in North America with 22% market share and 65% of sales tied to R&R. They offer a diversified mix brand portfolio across price points, product types and channels. MBC Stock/In-Stock product portfolio represents 550% of sales through Aristokraft, Diamond, Mantra and Thomasville brands (Price Point <\$200 per cabinet). Semi-Custom account for 33% and are sold by Diamond, Homecrest, KitchenCraft, Kemper, MC, Schrock, Thomasville and Urbaneffects. Finally, Custom/Premium are 12% of sales with a price point >\$600 (Decora, Fieldstone, Omega, Starmark and Ultra craft brands). These products are delivered through an industry-leading distribution network of over 4,400 dealers, major retailers and builders.

Exhibit 97: MBC Channel Mix

Dealers represent roughly 50% of MBC channel mix



Source: MBC

BofA GLOBAL RESEARCH

Channel Mix:

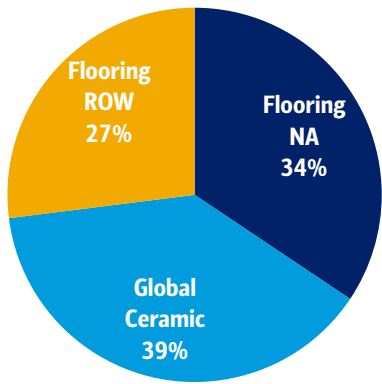
Masterbrand sells products across various channel mix, including Dealer with 50% (provide customer education, service and design consultation), In-stock retail 27% (standard products with little customization), Semi-Custom 13% (common box, but offer some customization) and Builder 10% (sold directly and highly levered to single-family housing starts).



Mohawk Industries (MHK)

Exhibit 98: MHK revenue by segment

Global ceramic accounted for 39% MHK's revenue in 2023



Source: MHK

BofA GLOBAL RESEARCH

Segment:

The Flooring NA segment manufactures and distributes floor covering products for residential and commercial construction, including carpets, rugs, hardwood, laminate and vinyl flooring (including LVT). Karastan, Mohawk, Mohawk Home, Pergo, Portico and Quick-Step are positioned to sell in the residential flooring markets. Aladdin Commercial and Mohawk Group sell in the commercial market. Flooring NA accounted for roughly 34% of consolidated sales in 2023.

The Flooring ROW segment manufactures and distributes laminate, hardwood and vinyl flooring (including LVT). In addition, this division provides roofing and insulation materials and medium-density fiberboards and chipboards for residential and commercial construction. Major brands include IVC, Modeleo, Pergo, Quick-Step and Unilin. Flooring ROW accounted for roughly 27% of sales in 2023.

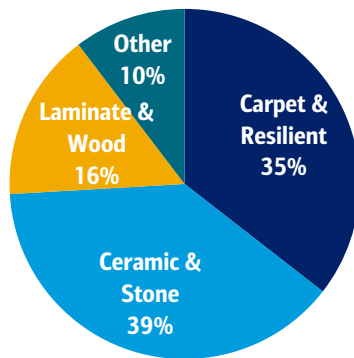
The Global Ceramic segment manufactures and distributes a range of ceramic and porcelain tile and natural stone products for residential and commercial construction. Major brands include Olean, Daltile, Eliane, EmilGroup, KAI, Kerama Marazzi, Marazzi and Ragno brand names. Global Ceramic accounted for roughly 39% of consolidated sales in 2023.

Product type:

Mohawk sells products across various sub-segments, including Carpet & Resilient, Ceramic & Stone, Laminate & Wood, and Other. In 2023, Mohawk derived 35% of its revenues from Carpet & Resilient, 39% of its revenues from Ceramic & Stone, 16% of its revenues from Laminate & Wood, and 10% from Other.

Exhibit 99: MHK revenue by product type

Carpet & Resilient and Ceramic & stone represent roughly 74% of MHK revenue



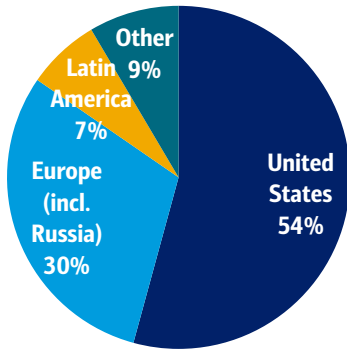
Source: MHK

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Exhibit 100: MHK revenue by geography

The U.S. accounted for 54% of MHK’s revenue in 2023



Source: MHK

BofA GLOBAL RESEARCH

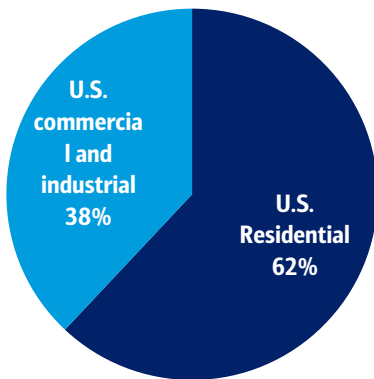
Geography:

Mohawk primarily derives its revenues from the United States but also derives a meaningful portion of its revenues from Europe and other international markets. In 2023, Mohawk derived 54% of its revenues from the United States, 30% of its revenues from Europe including Russia, 7% from Latin America, and 9% from other

Owens Corning (OC)

Exhibit 101: U.S. Insulation revenue by end-market

Residential Construction represent 62% of OC’s U.S. revenue in 2023



Source: OC

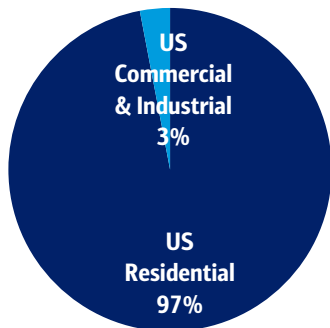
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Insulation:

The Insulation segment includes a diverse portfolio of high, mid and low-temperature products with a geographic mix of United States (62% of sales), Europe (21% of sales), Asia-Pacific (4% of sales) and Rest of the world (13% of sales). Insulation accounted for roughly 38% of consolidated sales in 2023. The North America market manufactures thermal and acoustical batts, loose fill insulation, spray foam, foam sheathing and accessories which are all sold under the PINK Fiberglass Insulation or Pink brands. The commercial and industrial markets are sold under FOAMULAR, FOAMGLAS and Paroc. The residential market accounts for 62% of US sales, while Commercial and Industrial segment represents 38%. Top competitors in Insulation include CertainTeed, Knauf and Johns Manville.

Exhibit 102: U.S. Roofing revenue by end-market

Residential Construction Materials accounts for almost all U.S. Roofing revenue (97%)



Source: OC

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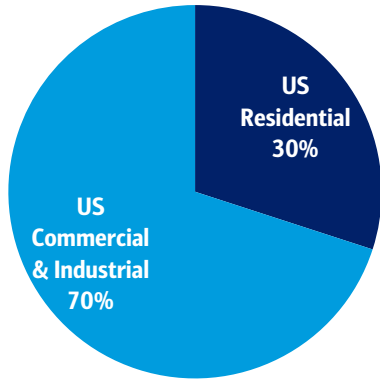
Roofing:

The Roofing segment manufactures laminate and strip asphalt roofing shingles, as well as other roofing accessories and underlayments. Roofing accounted for roughly 42% of consolidated sales in 2023. The US accounts for 97% of Roofing total sales and 97% of US sales were attributable to the Residential segment. Top competitors in Roofing include GAF, CertainTeed and TAMKO.



Exhibit 103: U.S. Composites revenue by end-market

Roughly 68% of U.S. Composites sales are attributable to Industrial & Commercial.



Source: OC

BofA GLOBAL RESEARCH

Composites:

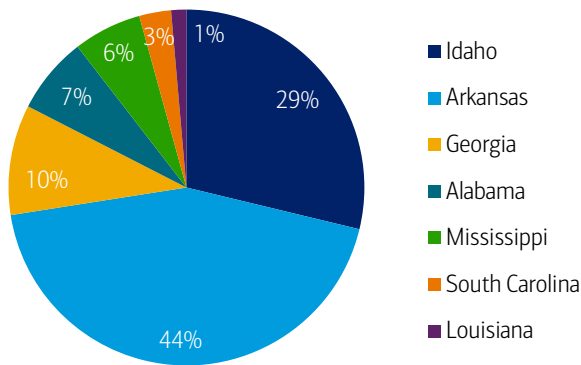
The Company manufactures, fabricates and sells glass reinforcements in the form of fiber and accounted for roughly 24% of consolidated sales in 2023. End-use applications include building structures, roofing shingles, tubs and showers, pools, decking, flooring, pipes and tanks, poles, electrical equipment and wind-energy turbine blades. Roughly 70% of U.S. Composites sales are attributable to Industrial & Commercial market. Top competitors in Composites include China Jushi Group, CPIC, Johns Manville and Nippon.

In 1Q24, OC announced it is initiating a strategic review process for the glass reinforcement business. On May 15 2024, OC completed their acquisition of Masonite.

PotlatchDeltic (PCH)

Exhibit 104: PCH Timberlands segment – land ownership by region

US South accounts for 71% of PCH’s land ownership by region



Source: Company filings

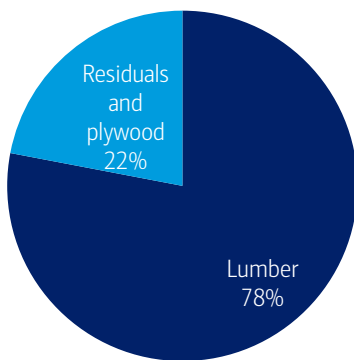
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Timberlands:

The Timberlands segment manages nearly 2.2M acres of land in both the Northern and Southern regions of the United States. As of 2023, the U.S. South accounted for approximately 71% of PCH’s land ownership, while Idaho accounted for 29%.

Exhibit 105: PCH Wood Products segment – capacity by segment

Nearly 78% of PCH’s Wood Products capacity comes from lumber



Source: Company filings

BofA GLOBAL RESEARCH

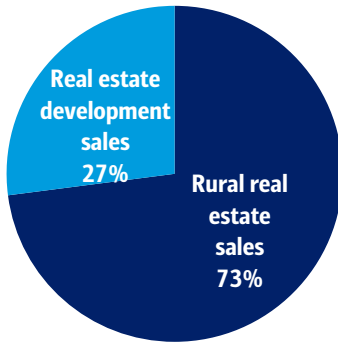
Wood Products:

PCH’s Wood Products segment manufactures lumber and plywood at seven mills located across Minnesota, Michigan, Idaho and Arkansas. In aggregate, PCH’s six lumber sawmills have 1.070 billion board feet of capacity while its plywood mill has 150 million square feet. In aggregate, 87% of Wood Products capacity is lumber, while 22% of capacity is residuals and plywood.



Exhibit 106: PCH Real Estate segment

PCH generates most profits from rural real estate sales



Source: Company filings

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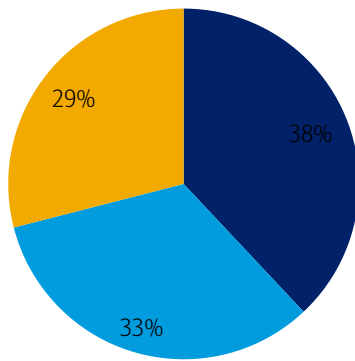
Real Estate:

PCH’s Real Estate segment engages in the sale of land holdings that are deemed as non-strategic or that have higher and better use alternatives. The activities of the Real Estate segment consist primarily of the sale of rural land and real estate development and subdivision activity. In 2023, the company sold 17,775 rural estate acres. In terms of development of real estate, it sold 128 residential lots and 12 commercial acres.

PPG Industries (PPG)

Exhibit 107: Revenue segment by end-market

Automotive OEM, Refinish/Collision and Aerospace account for 38%



Source: PPG

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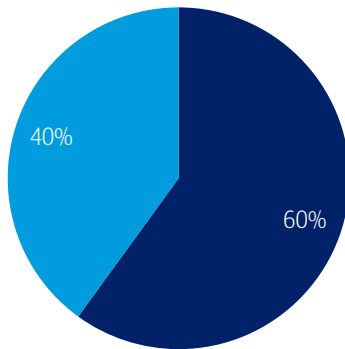
Industrial Coatings segment:

PPG is the second largest global player in Industrial coatings and global paint, right after Sherwin-Williams. PPG has completed 30 strategic acquisitions since 2015. The U.S. and Canada account for 42% of PPG Coatings net sales mix, followed by Europe, Middle East and Africa (EMEA) with 31%. Asia Pacific (AP) and Latin America (LA) represent 16% and 11%, respectively. 38% of PPG end-use comes from Automotive OEM, Refinish/Collision and Aerospace. 33% is architectural and 29% is General industrial, packaging, Protective & Marine and Pavement Markings. In terms of global end-use positions, PPG is #1 in Automotive OEM, Aerospace and Pavement Markings. It is also #2 in Architectural, Refinish / Collision and Packaging. Lastly PPG is #3 in General Industrial and Protective & Marine.



Exhibit 108: Products segment revenue by category

Performance coatings represents 60% of sales



Source: PPG

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Performance Coatings Segment:

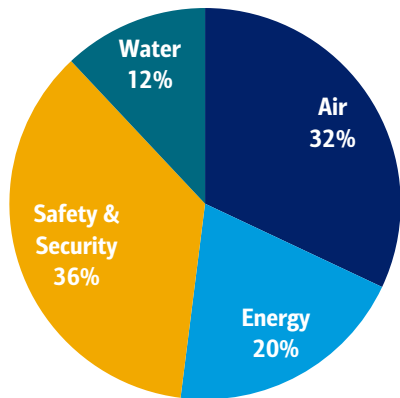
The Performance Coatings segment supplies coatings and specialty materials to a number of end-markets including: architectural, automotive refinish, aerospace, traffic solutions and protective and marine. The segment accounted for 60% of revenues in 2023. The US and Canada represent 44% of the 2023 segment sales followed by EMEA with 32%, LA 14% and AP 10%. Architectural coatings have the biggest industry estimated size and EMEA represents 40% of the 2023 sales (700 stores vs 800 in USCA).

The Industrial Coatings segment supplies coatings and specialty materials to a number of end-markets including: automotive OEM, industrial, packaging and specialty coatings and materials. The segment operates on a global basis and contributes 36% of 2023 consolidated sales. The US and Canada represent 36% of the 2022 segment sales followed by EMEA with 28%, AP 25% and LA 11%.

Resideo Technologies, Inc. (REZI)

Exhibit 109: Products segment revenue by category

Air and Safety & Security accounted for nearly 68% of product segment revenue in 2023



Source: REZI

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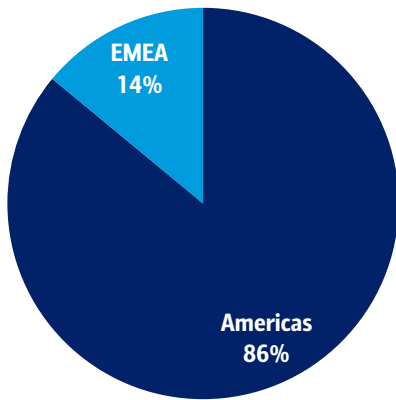
Products and Solutions:

REZI's Products and Solutions segment accounts for roughly 44% of net sales (as of 2023) and is divided into four main categories, Air (32% of sales), Security & Safety (36% of sales), Energy (20% of sales) and Water (12% of sales). Approximately 52% of REZI's finished products are manufactured in Mexico and REZI owns or leases 20 manufacturing sites and 4 warehouses worldwide. The Products and Solutions operating segment offerings include temperature and humidity control, energy products and solutions, water and air solutions, smoke and carbon monoxide detection home safety products, security panels, sensors, peripherals, wire and cable, communications devices, video cameras, other home-related lifestyle convenience solutions, cloud infrastructure, installation and maintenance tools, and related software.



Exhibit 110: Distribution segment revenue by geography

Roughly 86% of sales are attributable to the US and Canada



Source: REZI; BofA Global Research estimates

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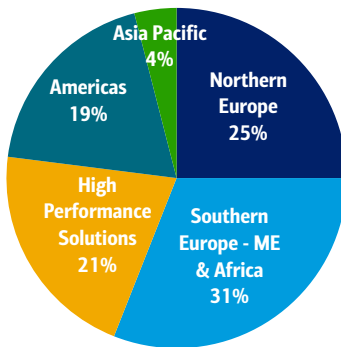
Distribution:

REZI's Distribution business, ADI Global, accounts for roughly 56% of net sales and is divided into three main categories, Americas (86% of sales), and EMEA (14% of sales). ADI Global Distribution owns or leases 175 stocking locations and 5 warehouses. ADI Global Distribution is a leading wholesale distributor of low-voltage security products including security, fire, access control and video products, and participates significantly in the broader related markets of smart home, access control, power, audio, ProAV, networking, communications, wire and cable, enterprise connectivity, and structured wiring products.

Saint-Gobain (SGO)

Exhibit 111: SGO revenues by segment

The majority of SGO's revenues are derived from Europe



Source: SGO

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Segments and Products:

SGO is organized into five reporting units: four regional businesses and a global High-Performance Solutions unit. The majority of SGO's revenues are derived from Europe, with Northern and Southern Europe collectively accounting for approximately ~56% of 2023 revenues. High Performance Solutions accounted for 21% of 2023 revenues and the Americas represented approximately 19% of total revenues. The remaining revenues from 2023 (4%) can be attributed to Asia Pacific.

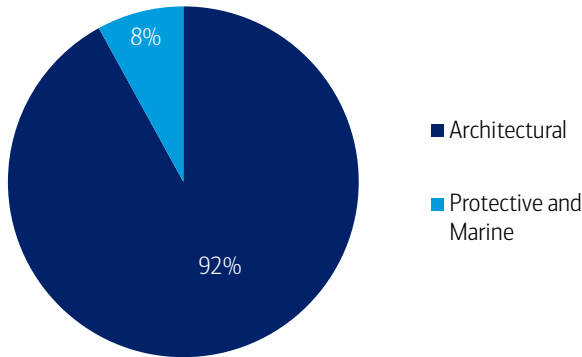
Saint-Gobain Group engages in the design, manufacturing, and distribution of building materials internationally. It is a worldwide leader in light and sustainable construction and sells and distributes various products across its markets and brands. These products include construction oriented Adfors and Gyproc (Gyproc®, Placo®, Rigips® and British Gypsum®), which sell fiberglass/polyester insect screens and plastic solutions for insulation, respectively. Within building distribution, SGO markets and sells Point.P, a supplier of building materials. Weber and Isover are both leaders in mortar-based solutions for building construction and renovation and sustainable insulation for the construction markets, respectively. Additionally, Norton offers polishing solutions through its Mobility and Industry segments.



Sherwin-Williams (SHW)

Exhibit 112: Paint Stores Group revenue by end-market (2022)

Architectural accounts for 92% of SHW's revenue



Source: BofA Global Research estimates

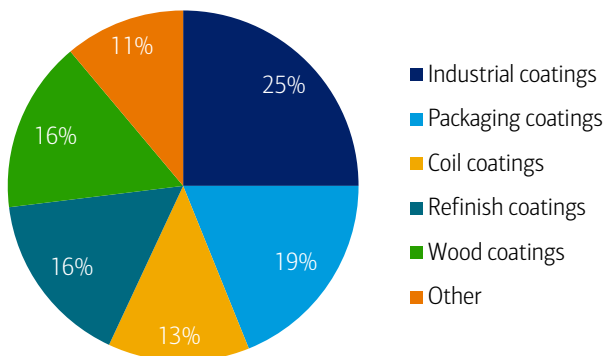
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Americas Group:

The Paint Stores Group, previously the Americas Group, consists of nearly 4700 company-operated specialty paint stores located in the US, Canada and the Caribbean region, and accounted for roughly 56% of 2023 consolidated sales. In terms of end market, residential repaint accounts for 26% of sales while New Commercial, New Residential and Property represent 21%, 19% and 17%, respectively. Protective & Marine and DIY account for 8% each. The company sells diverse products through the Sherwin-Williams and other controlled brands. Products include architectural paint and coatings, protective and marine products, and OEM product finishes, among others. The majority of the products sold are produced by manufacturing facilities in the Consumer Brand Group. In addition, the Americas Group sells a variety of architectural paints, coatings and related products through different distributors in Latin America (1,200 dealers, home centers distributors and stores across LA).

Exhibit 113: Performance Coatings Group revenue by end-market (2022)

The performance Coatings Group revenue is equally distributed



Source: BofA Global Research estimates

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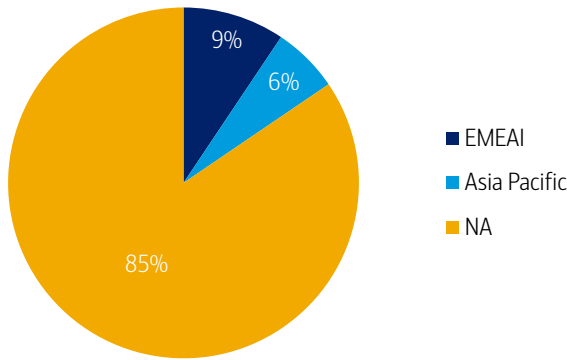
Performance Coatings Group:

The Performance Coatings Group sells a broad range of coatings and finishing solutions to general industrial, industrial wood, protective and marine, automotive refinish, packaging and coil customers in more than 120 countries. Coil was the Group's fastest-growing business, thanks to innovative new products such as Fluoropon Continuum.



Exhibit 114: Consumer Brands Group revenue by geography (2022)

NA represents 85% of revenue



Source: BofA Global Research estimates

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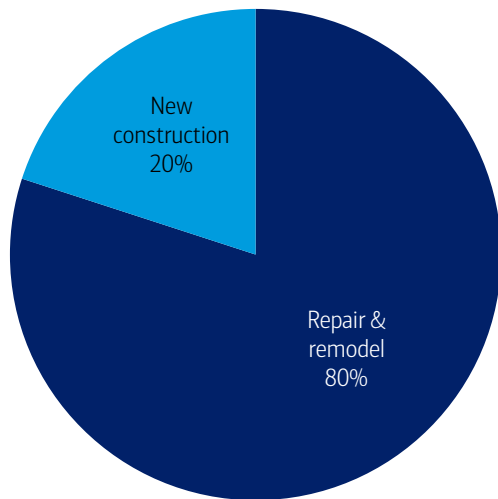
Consumer Brands Group:

The Consumer Brands Group sells one of the industry’s most recognized portfolios of branded and private-label products through retailers in North America, Europe and China. The Group also operates a highly efficient global supply chain for paint, coatings, and related products. Products sold: Branded, private-label and licensed brand paints, stains, varnishes, industrial products, wood finishing products, wood preservatives, applicators, corrosion inhibitors, aerosols, caulks and adhesives, and related products. In 2022, the segment accounted for 12% of total sales. Approximately 67% of the total sales of the Consumer Brands Group in 2022 were intersegment transfers of products primarily sold through The Americas Group.

Trex Company Inc. (TREX)

Exhibit 115: Industry market share (2022)

Composites comprise 25% of overall decking and railing



Source: TREX

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Industry:

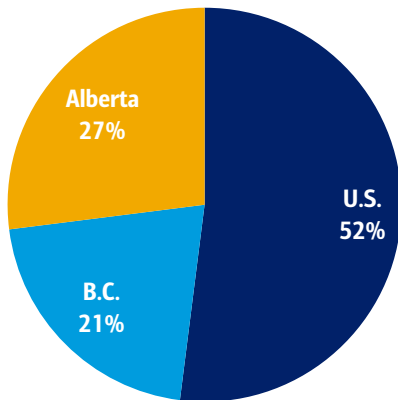
Trex primary competition for the composite decking and residential railing products consists of wood products, which constitute a substantial majority of decking and railing sales, as measured by linear feet of lumber. In addition to wood, TREX also competes with other manufacturers of wood-alternative products. Industry studies indicate that TREX has the leading market share of the wood-alternative segment of the decking and railing market. Trex’s principal competitors include The Azek Company Inc., and Fiberon (a division of Fortune Brands, Inc.). As of 2023, Composites comprised ~24% of the decking and railing industry, with wood accounting for the other 76%.



West Fraser Timber Co. (WFG)

Exhibit 116: WFG Lumber segment production capacity by region

The U.S. accounted for more than half of lumber production capacity in 2023



Source: WFG

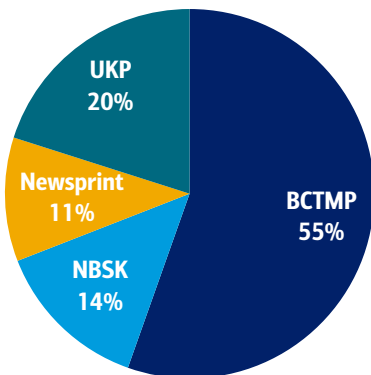
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Lumber:

West Fraser has a production of 6.7 billion board feet of capacity (SPF 3.1 Bfbm and SYP 3.6 Bfbm). Its manufacturing operations include 34 lumber mills. Lumber sales account for approximately 91% of the segment while wood chips & other residuals and logs & other represent 7% and 2%, respectively. Approximately 52% of its production capacity is in the southern US, and the remaining 48% is in Canada. West Fraser's largest competitors in lumber include Weyerhaeuser and Canfor.

Exhibit 117: WFG Pulp & Paper segment production by product

Bleached Chemi-ThermoMechanical Pulp is 55% of production



Source: WFG

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Pulp & Paper:

The Pulp & Paper segment manufactures Bleached Chemi-ThermoMechanical Pulp (55% of production), northern bleached softwood kraft pulp (14%), Unbleached Kraft Pulp (20%) and newsprint (11%).

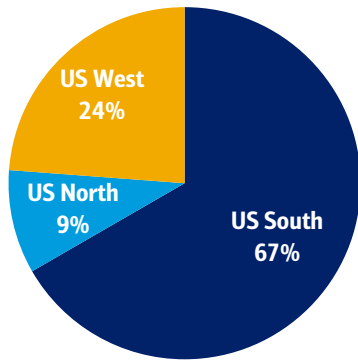
Sale of the UKP pulp mill was completed in February 2024; completely of the previously announced sale of the BCTMP mills is anticipated in early 2024.



Weyerhaeuser (WY)

Exhibit 118: Timberlands segment – land ownership by region

The U.S. South accounts for approximately 67% of WY’s land ownership



Source: WY

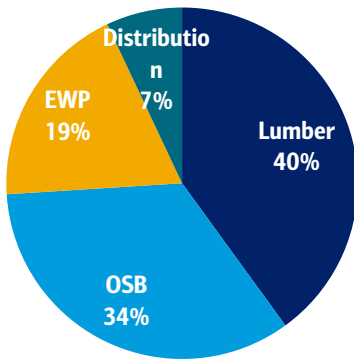
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Timberlands:

The Timberlands segment consists of WY’s timberland holdings, including 3mn acres in the US West, 7mn acres in the US South and 1mn acres in the US North. Overall, with approximately 10.5mn acres, WY is the largest timber REIT. The company harvests trees for use in production of wood products, pulp, and paper. Relative to other timber REITs, WY has the greatest exposure, in the US West, to Douglas Fir, which is valued by builders for its structural strength and sells at a significantly higher price point than Southern Pine. Top competitors in timberlands include Rayonier and PotlatchDeltic.

Exhibit 119: Wood Products segment – adjusted EBITDA breakout by business (2021-2023)

Lumber accounts for 40% of the wood products segment



Source: WY

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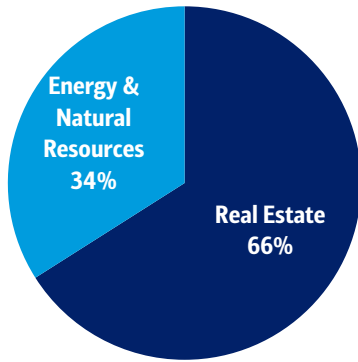
Wood Products:

The Wood Products segment manufactures a variety of products including lumber, oriented strand board (OSB), engineered wood products (EWP), plywood and fiberboard, accounting for 93% of consolidated sales in 2023. In North America, WY is the second largest producer of lumber (5.5 billion board feet of capacity), the fourth largest producer of OSB (3.1 billion square feet of capacity), and the largest producer of EWP (42 million cubic feet of engineered solid section capacity). It is also one of the top ten producers of plywood (610 million square feet of capacity). Its manufacturing operations include 19 lumber mills, 6 OSB mills, 6 EWP mills, 3 veneer/plywood mills and 1 MDF mill. WY also has a distribution business with 35 manufacturing facilities located across the US. Top competitors in lumber include West Fraser and Canfor.



Exhibit 120: Real Estate & ENR segment – adjusted EBITDA breakout by business (2021-2023)

Real estate accounts for 66% of the sales by business



Source: WY

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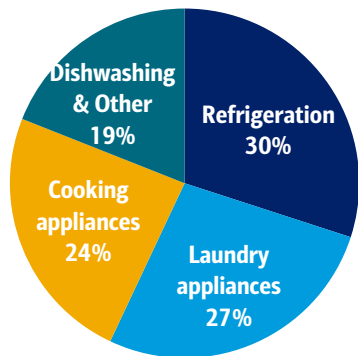
Real Estate, Energy and Natural Resources:

The Real Estate, Energy & Natural Resources segment identifies opportunities to obtain a premium value for WY’s timberlands. This may include real estate sales for recreational, conservation, commercial or residential uses. Additionally, WY may generate royalties or other revenues from mineral, oil, gas, renewable energy and other activities performed on its land. The company is growing its Climate Solutions (EBITDA to \$100 Million by YE 2025, \$47 Million in 2023) and sustainability-driven businesses (carbon credits, capture, etc.) within this segment.

Whirlpool (WHR)

Exhibit 121: WHR appliance sales by type

Refrigerators & laundry comprise the majority of WHR’s appliance sales



Source: WHR

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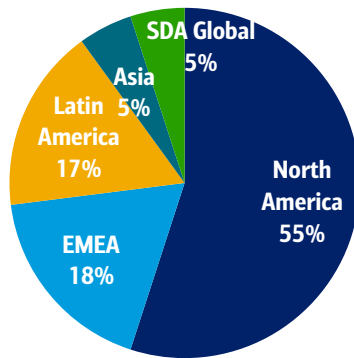
Appliance type:

Whirlpool manufactures and sells washers, dryers, refrigerators, freezers, cooking appliances, dishwashers, stand mixers and other small appliances under several brands including (listed from low to high-end) Amana, Whirlpool, Maytag, KitchenAid and Jenn-Air. The company also has strong positions in key global marketplaces such as the U.S., Brazil, Canada, India, Mexico and Italy. Top competitors include BSH (Bosch), Electrolux, Haier, Hisense, LG, Mabe, Midea, Panasonic and Samsung,



Exhibit 122: Revenue by geography

North America accounts for more than half of WHR's sales



Source: WHR

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Geography:

Whirlpool generated 55% of its revenue in North America in 2023. EMEA was Whirlpool's next largest region, making up 18% of sales in 2023. LATAM and Asia regions collectively accounted for around 23% of sales in 2023, but represent substantial growth opportunities, given low household penetration of appliances.

Insufficient data was available for certain private companies and multi-industrial firms where building products represent a relatively small portion of the overall business. As such, snapshots have been excluded for Andersen, Electrolux, GAF, General Electric, Georgia-Pacific, Ingersoll Rand, Johns Manville, Knauf, Kohler, National Gypsum, Tarkett, Shaw and United Technologies.

Private Equity in Building Products

Private equity (PE or "sponsors") and other private capital has a long history of investing in the building products sector, including in businesses carved-out of larger public companies. PE has played in most areas of the building products ecosystem including distribution, residential focused product manufactures, commercial and industrial oriented companies and aggregates and ready-mix producers. We believe PE's participation in the space is supported by the industry's:

- Long operating history;
- Relative simplicity;
- Access to debt capital markets;
- Favorable free cash flow characteristics; and
- Fragmentation and ongoing consolidation.

PE's active involvement in building products in the last 5-7 years has also been driven by a favorable secular backdrop that includes:

- A lack of investment in housing in the years following the Global Financial Crisis;
- The aging of the US housing stock (median age 40+ years);
- Strong demographic trends with the aging of the Millennial generation; and
- Accumulated home equity of > \$32 trillion in the US.

In building products companies, PE finds well established business with decades or more of operating history. Most of these businesses have been tested through multiple economic/housing cycles. Building products also generally have a low risk of obsolescence and/or significant technological disruption.

In favorable credit markets, sponsors typically acquire building products companies at mid-to high-single-digit to low-double digit enterprise multiples of EBITDA (i.e. 6-10x). These transactions are financed with secured term debt or notes, senior unsecured notes and cash equity. Building products companies also often have access to the asset-based lending market (ABL) market, offering an attractive option to finance accounts receivable and inventory.



While credit market conditions are obviously variable, normalized debt markets generally support 4-6x leverage (debt to EBITDA) on target building product companies. While the Federal Reserve's current rate hiking cycle has curtailed levered building products companies access to credit, deals for high quality issuers (particularly secured debt) are still being executed even today.

With broad investor and capital markets interest in the industry, PE firms can look to other PE firms (private to private), consolidating public companies (private to public) and the public markets (Initial Public Offering) as potential avenues to monetize their investment at the end of their holding period.

While credit market conditions today are constraining PE activity in the building products space (and more broadly), we expect that sponsors will remain active in the industry over time given its many attractive investment attributes.

The table below gives an overview of recent private equity transactions in building products that have been publicly report.

Exhibit 123: Building Products LBOs

Target description, bond ticker, and purchase price of LBOs

Date	Sponsor	Target	Target Description	Bond Ticker	Purchase Price(\$MM)
Jun-24	Blackstone	Emerson Climate Technologies	Blackstone acquired remaining 40% interest in Emerson Climate Technologies for \$1.5 billion and repurchased a ~\$2.3 billion seller note for \$1.9 billion.	EMECLI	N/A
Oct-22	Blackstone	Emerson Climate Technologies	Emerson Climate Technologies is a provider of HVACR compressors, controls, components and solutions.	EMECLI	14,000
Mar-22	Clayton, Dubilier & Rice	Cornerstone Building Brands	Cornerstone Building Brands manufactures external building products	CNR	5,800
Feb-22	KPS Capital Partners, LP	Oldcastle BuildingEnvelope	Oldcastle BuildingEnvelope provides architectural hardware, glass and glazing products	OBEBLD	3,450
Jul-21	Clearlake Capital Group	Springs Window Fashions	Springs Window Fashions is a supplier of blinds, shades and specialty treatments	SPRIND	N/A
Apr-21	Platinum Equity	Cabinetworks Group	Cabinetworks manufactures cabinets for R&R and new construction	ACPROD	N/A
Apr-21	Madison Industries	Nortek Air	Madison IAQ is a provider of air quality products and solutions	MADIAQ	3,625
Dec-20	The Jordan Company	Specialty Building Products	Specialty Building Products distributes specialty building products	SBPLLC	1,100
Nov-20	American Securities	Foundation Building Materials	Foundation Building Materials distributes wallboard, metal framing and other products	FBM	1,370
Nov-20	Clearlake Capital Group	PrimeSource Building Products	PrimeSource distributes fasteners and building materials	PRIMBP	N/A
Nov-20	Bain Capital Private Equity	US LBM	US LBM distributes specialty building materials in the US	USLBMH	2,775
Oct-20	Centerbridge Partners	American Bath Group	American Bath provides shower, bathtubs, soakers and specialty bath products	AMBATH	1,850
Aug-20	Clayton, Dubilier & Rice	White Cap (HD Supply spin-out)	White Cap distributes concrete accessories and specialty products	WHTCAP	2,900
Apr-18	Leonard Green & Partners	SRS Distribution	SRS Distribution is the third largest distributor of roofing products in the US	SRSDIS	3,600

Source: Bloomberg; Company filings; BofA Global Research estimates

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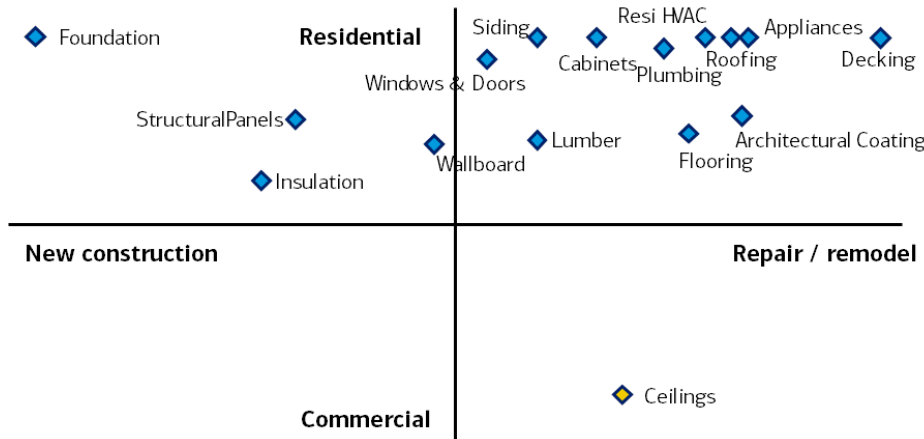


Drivers of four building product end-mkts

The building product industry’s end-markets can be broadly categorized within four major buckets: new residential construction, residential repair and remodel (R&R), new commercial construction and commercial repair and remodel. In the matrix below, we plot the 16 major building product component groups (and commercial ceilings) in an attempt to illustrate the residential versus commercial and new construction versus R&R mix for each. Most building component groups have the greatest exposure to residential R&R activity and the least exposure to commercial new construction. Our Who Builds the House report is focused exclusively on the residential markets, but we provide information on the commercial markets in this section for context.

Exhibit 124: Building products mix and end-market matrix by industry

Most building component groups have the greatest exposure to residential R&R activity



Source: BofA Global Research estimates, company filings, *ceilings is 95% commercial construction

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New residential construction (30% exposure)

Overview

US building products companies have an estimated 30% end-market exposure to new residential construction, on average. We discuss this end-market first as it forms the basis of our housing supply and demand assumptions. We estimate the residential new construction exposure of each major building products sub-industry in the table below.

Exhibit 125: Estimated NA residential new construction mix by building products subsector

US building products companies have an estimated 30% end-market exposure

Industry subsector	Total Market Size	% Resi NC
Framing Lumber/Engineered Wood	\$24.8bn	31%
Concrete (foundation)	\$16.3bn	100%
Windows & Doors	\$14.5bn	42%
Siding	\$13.0bn	45%
Cabinets	\$11.7bn	29%
Plumbing	\$10.1bn	23%
HVAC	\$22.1bn	25%
Roofing	\$14.8bn	6%
Flooring	\$34.1bn	17%
Wallboard/Drywall	\$6.3bn	38%
Structural panels	\$14.6bn	50%
Appliances	\$40.8bn	15%
Architectural coatings	\$15.8bn	12%
Fiberglass insulation	\$4.1bn	42%

Source: Company data, Floor Covering Weekly, Freedonia, Asphalt Roofing Manufacturers Association, Gypsum Association, BofA Global Research

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The recovery in US new home sales volume and housing starts was slow to materialize post GFC vs. previous economic cycles. US housing starts and new home sales remained below the long-term averages of approximately 1.4mm starts and 700K new home sale units, until they picked up in 2020/2021.

We believe the slow recovery in housing is attributable in part to the magnitude of the housing downturn that coincided with the Great Recession, where peak to trough housing starts declined by 73%, or by 26 percentage points more than the average of the past three cycles.

Exhibit 126: Peak to trough US housing starts over time

We expect that 2021 might be a new peak in the home starts

<u>Peak</u>		<u>Trough</u>		<u>Length of downturn (years)</u>	<u>% decline vs. peak</u>	<u>Next peak</u>	
<u>Year</u>	<u>Starts</u>	<u>Year</u>	<u>Starts</u>			<u>Year</u>	<u>Starts</u>
1972	2,357	1975	1,160	3	-51%	1978	2,020
1978	2,020	1982	1,062	4	-47%	1986	1,805
1986	1,805	1991	1,014	5	-44%	2005	2,068
Average 2,061		1,079		4	-48%	1,965	
2005	2,068	2009	554	4	-73%	TBD	TBD
2021	1,601	TBD	TBD	-	-	TBD	TBD

Source: US Census Bureau; BofA Global Research estimates

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New Home sales have been consistently increasing until a recent peak in 2020 as demand was unsustainably strong due to historically low mortgage rates and a housing focused Covid economic rebound. Housing remained one of the hottest sectors of the economy throughout the coronavirus pandemic, as tight inventory and high demand have caused buyers to move quickly when available homes come onto the market. However, despite the continuity of the pandemic, 2021 sales ended 7% lower than 2020, as builders slowed some sales to manage ongoing building material and labor issues affecting the housing industry. On the other hand, total starts continued to rise through the years, led by single family, until 2022.

2022 was a challenging macroeconomic year. Inflation peaked at 9% in June 2022, the largest gain since the end of 1981. In order to fight inflation, the Federal Reserve (Fed) continued to raise interest rates, leading to increased mortgage rates. The Freddie Mac 30 YR mortgage rate peaked in October reaching 7.08, a ~300bps increase YoY. Rising mortgage rates and persistently high prices for building materials caused an affordability shock. The NAR Housing Affordability Index averaged 105.8 in 2022 (compared to 155.8 in 2021), reaching its lowest level in October 2022 (91.3). The affordability plunge resulted in lower expectations for sales causing a sequential decline in the Homebuilder confidence for 12 straight months.

Housing starts fell -3% YoY, in 2022, led by single family snapping a 12-year sequential increase. However, starts were still up 25% compared to 2018. Single-family starts fell for the first time since 2011 (-11% YoY), while multi-family rose 16% YoY. New Home sales fell -17% YoY, in 2022, down for the second consecutive year.

In 2023, housing starts declined another 9% YoY with affordability challenged with mortgaged rates holding steady in the 6%-8% range. Despite higher rates, single-family home sales increased 4% YoY off the low 2022 base.

2024 single-family starts are 19% higher YoY through May, but have slowed, on a seasonally adjusted annualized basis, throughout the year. We are forecasting 2024 starts up 8% YoY.

A downturn in the overall economy over the next few years could cause the housing recovery to moderate. COVID-19 was a catalyst in “catching-up” on pent-up housing demand (based on household formations), bringing the overall housing formation to a surplus in 2023, vs. a deficit of approximately 1.2mm units from before the start of

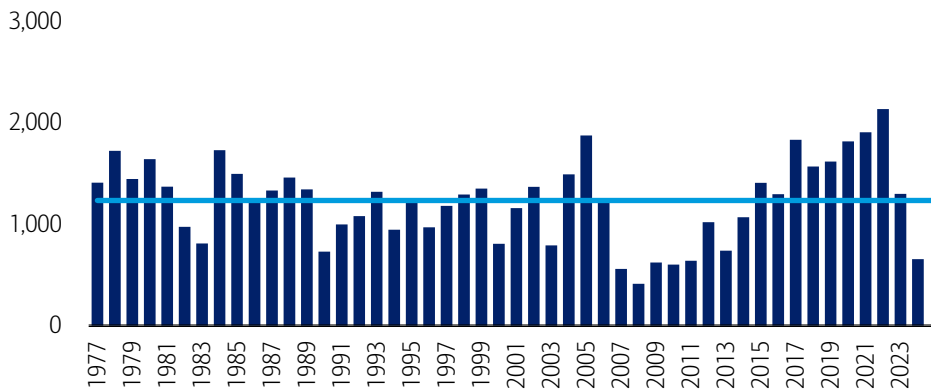


COVID-19. Several interconnected factors also contributed to this “catch-up,” including a COVID-induced wallet share shift from discretionary spend on travel/outdoor eating towards investment in home improvement, as people began to spend significantly more time at home. Additionally, the Fed’s easy monetary policy and balance sheet expansion during COVID placed more money directly into consumers’ pockets, which was heavily allocated towards the home.

However, we expect a decreasing number of household formations for 2024 that will reduce the surplus.

Exhibit 127: Estimated household formations from 1977-2024E (units 000s)

Household formations ramped up during COVID, but likely peaked in 2022



Source: Census Bureau, BofA Global Research estimates

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Drivers

Consumer confidence, job growth and wage growth are key

The purchase of a home is likely the biggest investment most people will make over the course of their lifetime. As a result, we believe buyers must be confident in both their current and prospective financial positions and arguably the state of the overall economy. As a result, we view consumer confidence, employment growth and wage growth as a few of the most relevant economic metrics for the homebuilding industry. Other important considerations are overall economic growth expectations, household formation trends and the relative level of mortgage rates and home prices versus rental costs.

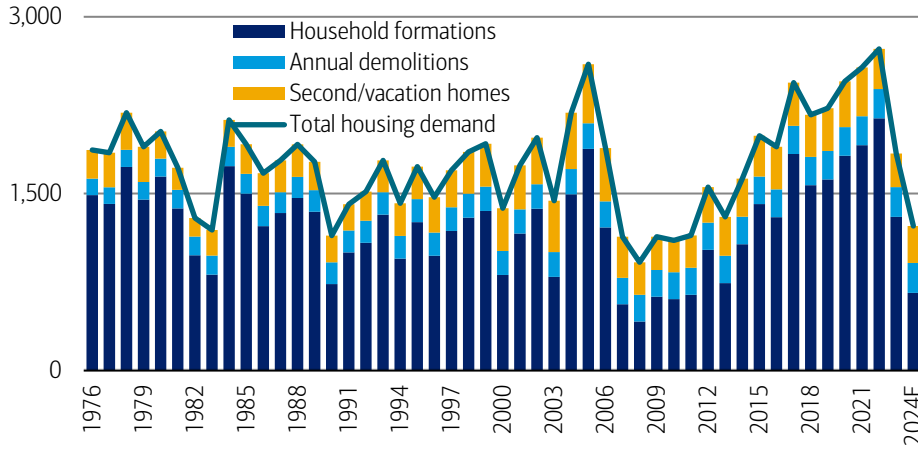
Supply-demand analysis suggests more building needed in 2024

We calculate a relative proxy for each demand and supply metric for new homes using data reported by the US Census Bureau. In our view, housing demand can be estimated as the sum of household formations (calculated as population growth multiplied by the headship rate), demolitions of existing homes (around 250-300K per year. 252K in 2023) and second homes used for vacation purposes (285K in 2023). In 2023, we estimate total housing demand was around 1.8mm units.



Exhibit 128: Housing demand breakdown (units 000s)

In 2024, we estimate total housing demand of around 1.2mm units.



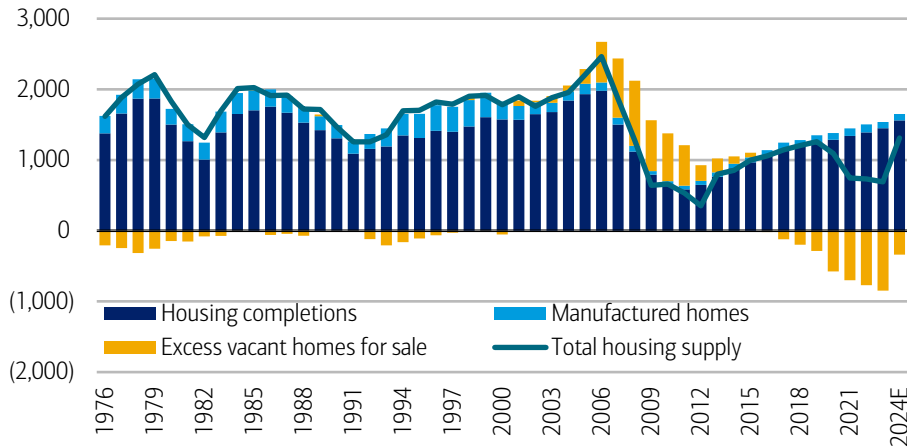
Source: Census Bureau, BofA Global Research estimates

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For housing supply, we sum new housing completions, new manufactured (mobile) homes, and excess vacant for sale homes (the vacancy level above the average historical vacancy rate). Using this equation, we derive an estimate for housing supply of approximately 0.7mm units in 2023.

Exhibit 129: Housing supply breakdown (units 000s)

In 2024, we estimate a housing supply of approximately 1.3mm units.



Source: Census Bureau, BofA Global Research estimates

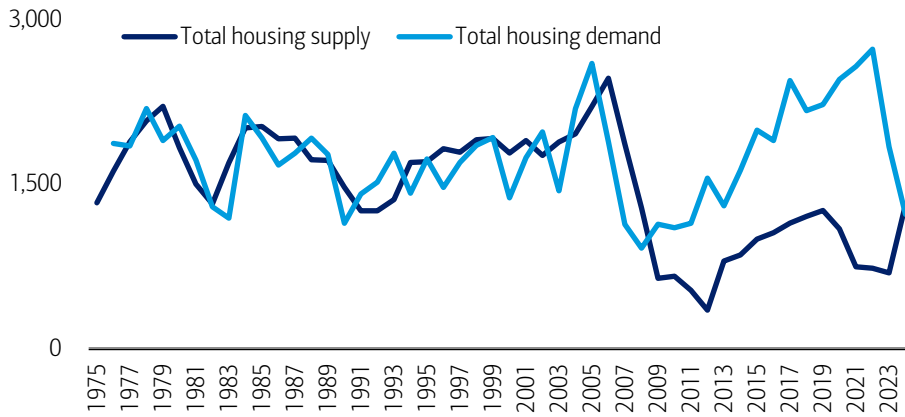
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This analysis suggests that the 2023 ratio of supply to demand is around 38%, (vs 27% in 2022) indicating that the market remains in a state of underbuilding (demand is outpacing supply). As a point of reference, from 2007-2009, in the midst of the Great Recession and housing collapse, the ratio of new home supply to demand averaged close to 200%, reflecting a period of mass oversupply. While our methodology is admittedly imperfect, we believe it can be directionally helpful in determining market balance, and currently indicates a need for greater new home construction in the US. However, the limiting factors discussed above may result in this imbalance remaining in place, at least to some degree, over our forecast period. For 2024 we expect the ratio of supply to demand to increase sharply to 107%.



Exhibit 130: Housing supply vs. demand (units 000s)

In 2023, demand outpaced supply



Source: Census Bureau, BofA Global Research estimates

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Outlook: improving conditions expected through 2024 after signs of stabilization

We forecast US new home sales to increase 8% YoY in 2024, after a 4% increase in 2023.

Residential repair and remodel (59% exposure)

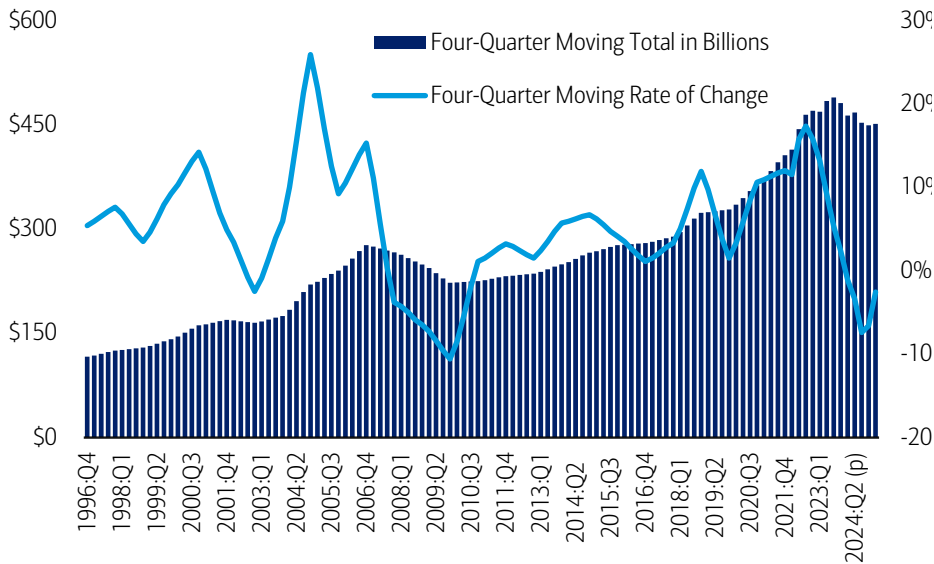
Overview

US building products companies have an estimated 59% end-market exposure to residential repair and remodel activity, on average. The US residential repair and remodel industry is very large, relatively diversified and generally more stable than the new construction industry. The Leading Indicator of Remodeling Activity (LIRA) index, created by the Joint Center for Housing Studies at Harvard University, estimates the US market for home improvement and repair activity related to owner-occupied homes will be approximately \$451B in 1Q2025.

We estimate the repair and remodel mix of each subsector in the table below.

Exhibit 131: Leading Indicator of Remodeling Activity (LIRA) index (2/3 labor, 1/3 materials)

The LIRA Index is projected to reach \$451B in Q1 2025, a YoY decrease of (2.6%)



Source: Harvard University LIRA Index; American Housing Survey

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Exhibit 132: Estimated NA residential R&R mix by building products subsector

Roofing has the largest resi R&R mix % of the component types

Industry subsector	Total Market Size	% Resi R&R
Framing Lumber/Engineered		
Wood	\$24.8bn	42%
Concrete (foundation)	\$16.3bn	na
Windows & Doors	\$14.5bn	48%
Siding	\$13.0bn	42%
Cabinets	\$11.7bn	71%
Plumbing	\$10.1bn	74%
HVAC	\$22.1bn	75%
Roofing	\$14.8bn	88%
Flooring	\$34.1bn	63%
Wallboard/Drywall	\$6.3bn	48%
Structural panels	\$14.6bn	27%
Appliances	\$40.8bn	85%
Architectural coatings	\$15.8bn	71%
Fiberglass insulation	\$4.1bn	19%

Source: Company data, Floor Covering Weekly, Freedonia, Asphalt Roofing Manufacturers Association, Gypsum Association, BofA Global Research estimates

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The US residential repair and remodel industry tends to be less cyclical than the new construction industry. To put this into context, the LIRA index declined by roughly 20% on a peak-to-trough basis from 2006-2009, versus the nearly 73% decline in US housing starts over roughly the same period.

Exhibit 133: LIRA Index: Great Recession peak-trough decline (\$bn)

LIRA index tends to be less cyclical as an example we have the great recession

2006 peak (4Q06)	\$276.70
2009 trough (4Q09)	\$222.40
Peak-trough decline	-19.60%

Source: JCHS, American Housing Survey data, BofA Global Research

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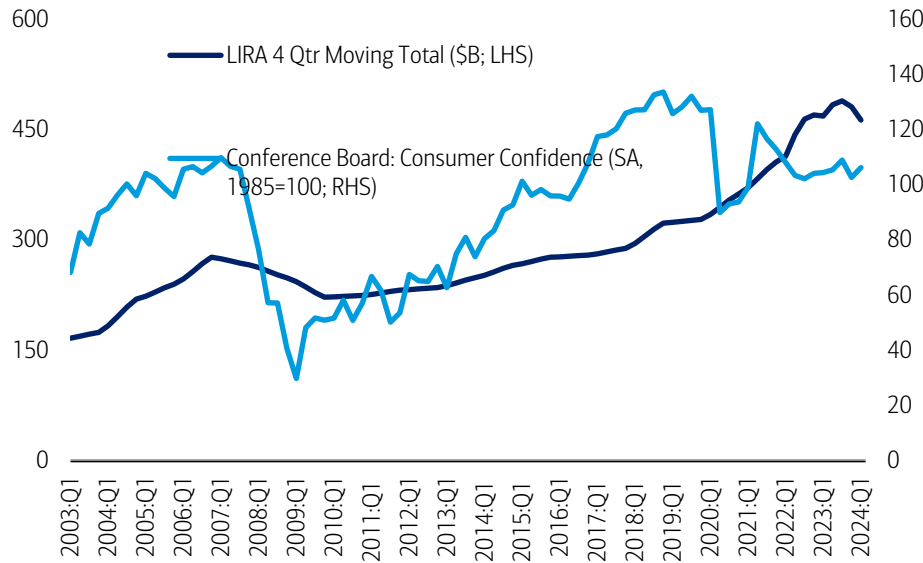
Drivers

In our view, the US residential repair and remodel industry is influenced by numerous macro related factors. First, consumer confidence is critical for residential repair and remodel activity, similar to its effect on most large-ticket purchases. Consumer confidence tends to reflect the state of the general economy, employment trends, wages, and etcetera and therefore appears to be a reasonably good proxy for the consumer's willingness to spend. Consumer confidence has been relatively supportive of residential repair and remodel activity since the Great Recession. However, the Covid-19 pandemic brought a significant fall in the Conference board consumer confidence given the unknown environment. After a brief increase in mid-2021 (back to 2018 levels), the consumer confidence board fell in 2022, given economic uncertainty. In May 2024, the consumer confidence index rose to 102.0 off a 2-year low of 97.5 in April.



Exhibit 134: Consumer confidence is a driver of residential repair and remodel activity

1Q2024 Consumer Confidence is up QoQ and YoY



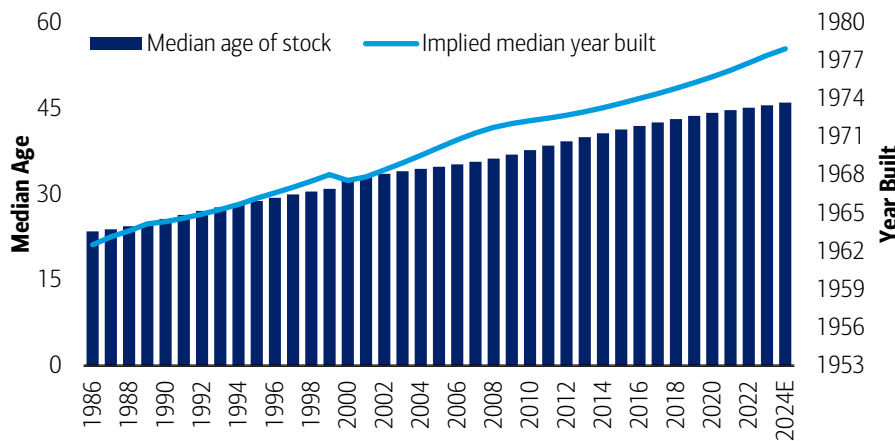
Source: Conference board, JCHS, BofA Global Research
Data through 1Q 2024

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We also believe that residential repair and remodel activity is driven by the age of the US housing stock, as older homes typically have been exposed to a greater degree of wear and tear relative to new builds. We estimate the median age of the 2023 housing stock at approximately 46 years old, implying a median year built of 1977. The US housing stock is now at its oldest point in history, which should also support residential repair and remodel activity.

Exhibit 135: Median age of housing stock

At 46 years, the median age of housing stock was up slightly YoY in 2023



Source: American Housing Survey, BofA Global Research estimates

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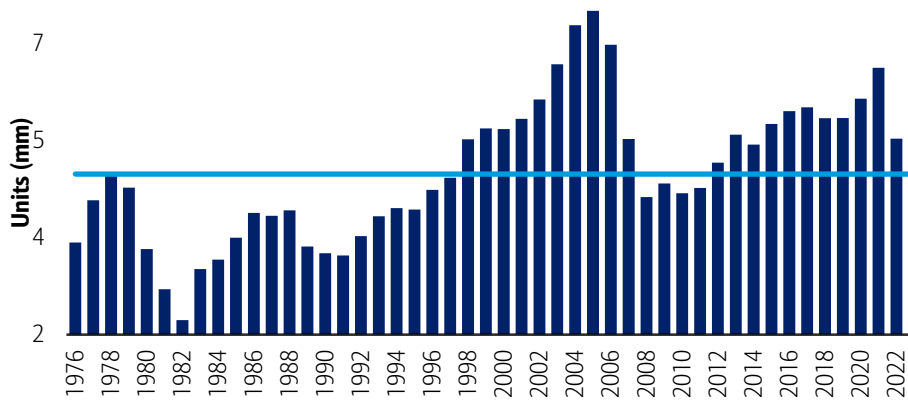
A third key driver of residential repair and remodel activity is existing home sales turnover and existing home sale values. These factors are also relatively intuitive in that most repair and remodel activity occur when title of a home changes hands and the new owner makes alterations and updates to reflect his/her personal style and preferences. Therefore, higher existing home sales volume should result in greater residential repair and remodel activity. The recent trend of increasing Millennials buying homes should also support R&R activity. Our 2023 Millennial housing survey suggests that Millennial



homeownership rates will continue to increase in the coming years. Of those surveyed, 66% said that they are “extremely likely” (18%), “very likely” (22%) or “somewhat likely” (27%) to buy in the next two years. Also, 82% of those surveyed stated a preference to buy an older, less expensive home and renovate it to save money rather than buy a newly built home. Of the homeowners surveyed, 56% started home improvement projects within the first 12 months of their purchase. The home improvement projects most often completed by Millennials include painting/wallpapering (32%), landscaping (27%) and upgrading appliances (27%), while many high-ticket projects like bathroom remodels (17%), flooring (15%) and patio/deck/garage & driveway improvements (15%) are still on the to-do list for the next 12 months. In 2023 the US existing home sales fell 19% YoY to the lowest level since 1995. Higher interest rates have caused in a lock-in effect, leading to lower existing home inventory and turnover, which has weighed on repair and remodel spending.

Exhibit 136: US existing home sales

2023 US existing home sales decreased (19%) y/y



Source: National Association of Realtors; BofA Global Research estimates

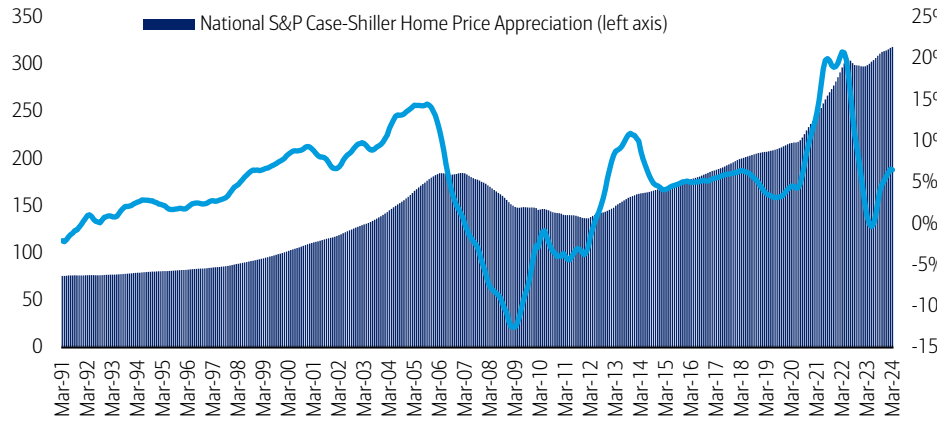
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Existing home values are also correlated with the level of residential repair and remodel activity given that homeowners sometimes borrow against the equity in their homes to finance larger improvement projects. In addition, rising existing home values tend to support remodeling activity as it reinforces the view that investing in a home is a sound financial decision. According to the S&P Case-Shiller Home Price Appreciation Index, the value of existing homes reached an all-time high in March 2024. In March 2024, home values were up 6% on a YoY basis and 54% above March 2019.



Exhibit 137: S&P Case-Shiller Home Price Appreciation Index

The index climbed 6% YoY in March '24



Source: Bloomberg; BofA Global Research estimates

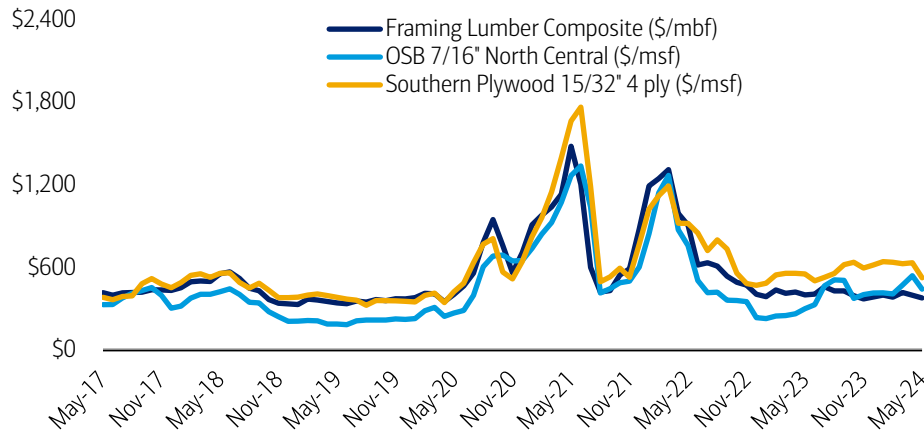
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Appendix: select sub-industry charts

Framing Lumber/Engineered Wood:

Exhibit 138: Framing Lumber Composite (\$/mbf), OSB 7/16" North Central (\$/msf) and Southern Plywood 15/32" 4 ply (\$/msf)

Lumber, OSB and Plywood prices hit historical highs during the pandemic, but have all moderated significantly



Source: Random Lengths

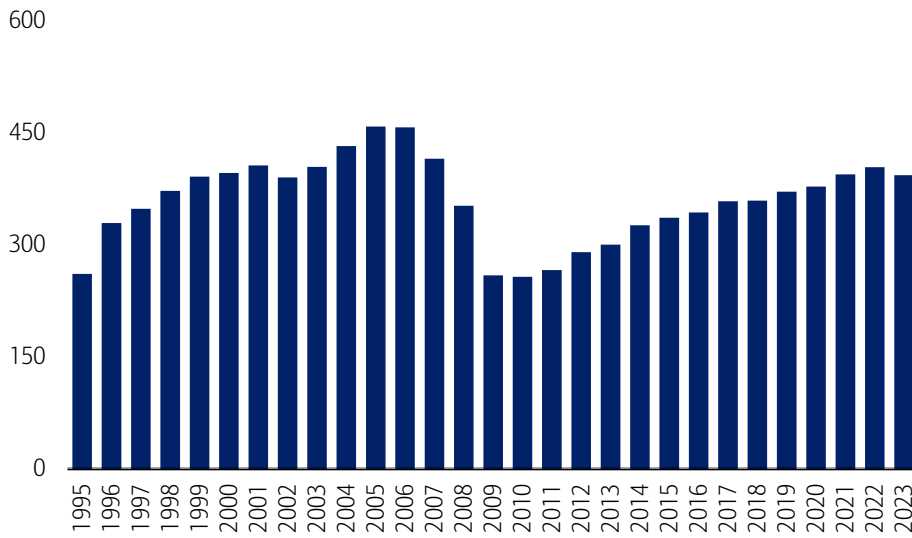
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Concrete/Foundation:

Exhibit 139: Residential ready-mix concrete volumes (mms of cubic yards)

Residential ready-mix concrete volumes decreased slightly in 2023 compared to 2022



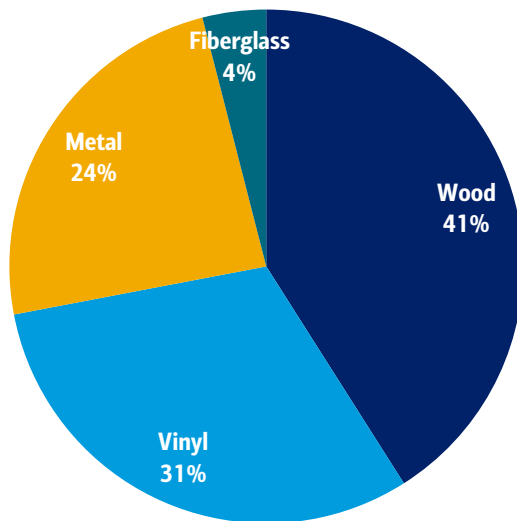
Source: NRMCA, USCR, BofA Global Research estimates

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Windows and Doors:

Exhibit 140: Global residential windows and doors: Materials

Wood in the leading global material for windows and doors in 2022



Source: Woodworking Network: The Freedonia Group, Global Residential Windows & Doors (August 2022)

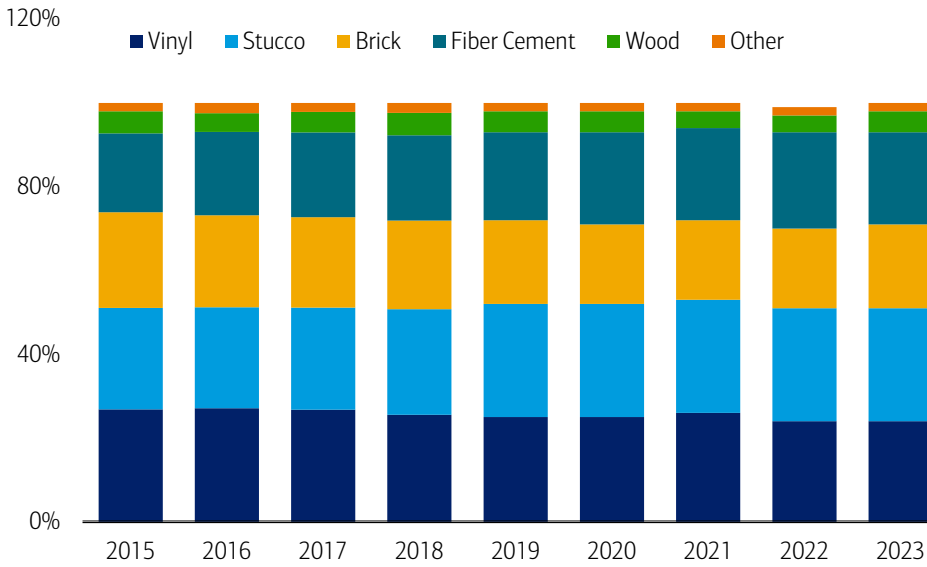
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Siding:

Exhibit 141: Principal siding material on new single-family homes started

Stucco was the most common principal siding material (27%) in 2023



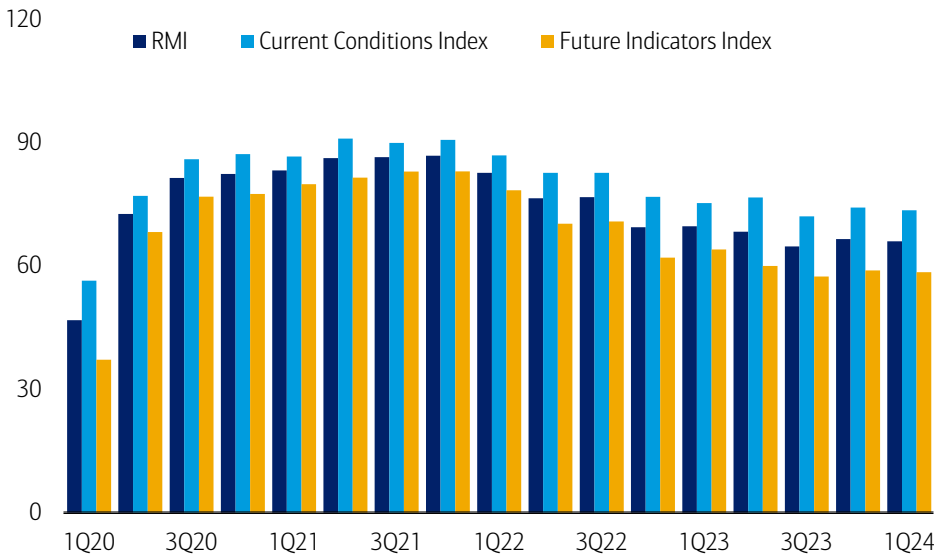
Source: Census Bureau's Survey of Construction (SOC) 2023

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Plumbing:

Exhibit 142: NAHB/Westlake Royal Remodeling Market Index (RMI)

1Q24 RMI: 66 (vs 67 in 4Q23); Current conditions index: 74 (vs 74 in 4Q23) and future indicators: 58 (vs 59 in 4Q23)



Source: NAHB

Note: The scale from 0 to 100, where an index number of 50 indicates a higher share of remodeler's view conditions as good rather than poor

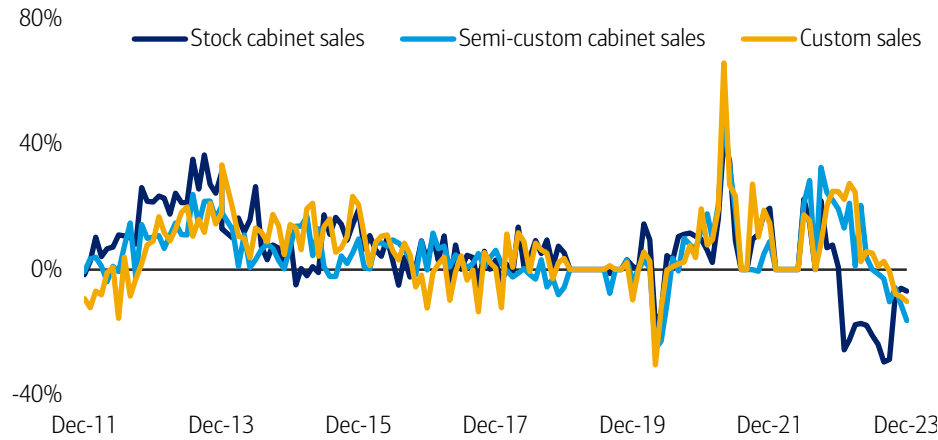
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Cabinets:

Exhibit 143: US Cabinet industry YoY shipment growth by product type

US cabinet shipments slowed in 2023 with significant pressure on stock products



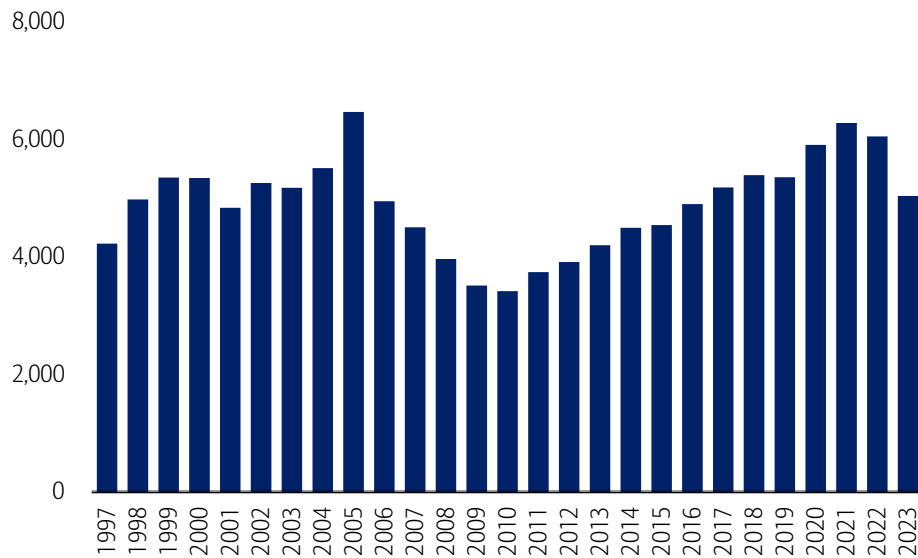
Source: KCMA

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HVAC:

Exhibit 144: US central air conditioner shipments (000s units)

US central air conditioner shipments decreased in 2023 (-17% YoY)



Source: AHRI

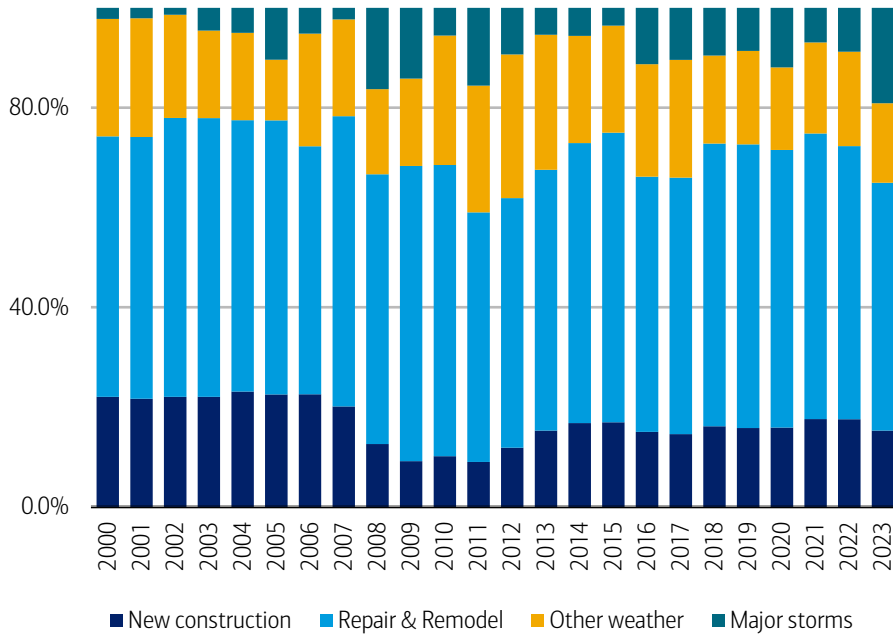
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Roofing:

Exhibit 145: US Asphalt shingle market (mm sq.)

R&R and weather-related repairs accounted for over 80% of the US Asphalt shingle market



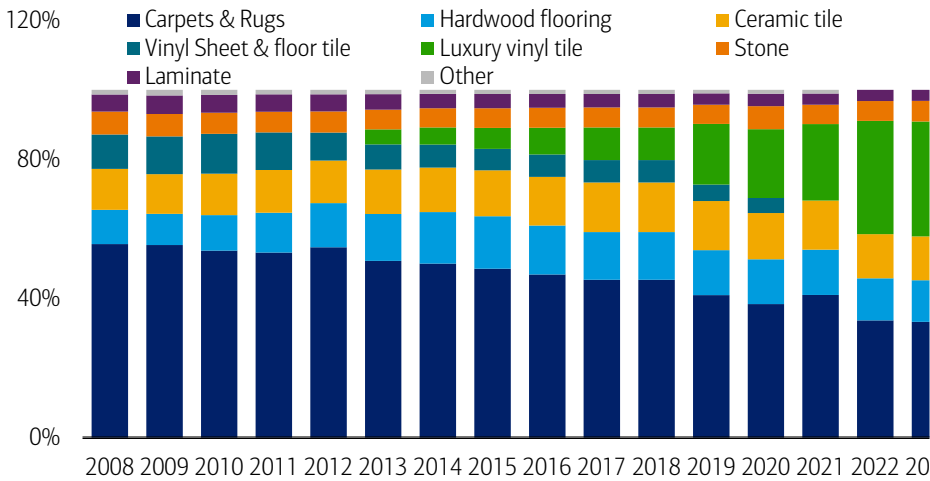
Source: Asphalt Roofing Manufacturers Association; Owens Corning

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Flooring:

Exhibit 146: US Flooring market share by product type

In 2023, Luxury Vinyl Tile increased its market share to 33.0%



Source: Catalina Research, Flooring Cover Weekly, BofA Global Research estimates; LVT figures introduced in 2014

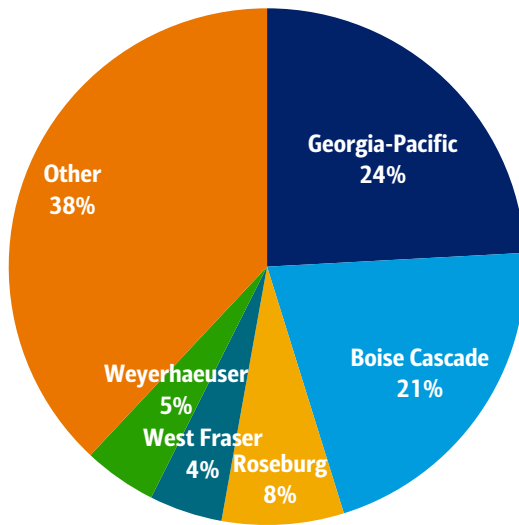
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Structural Panels:

Exhibit 147: NA Plywood market share

Top 3 producers account for 53% of the Plywood market



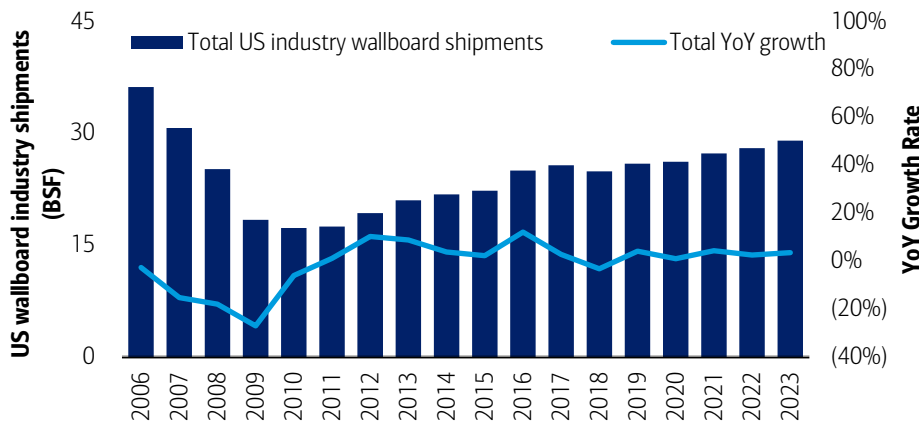
Source: RISI

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Wallboard:

Exhibit 148: Estimated US Wallboard industry shipments and YoY growth

US Wallboard industry shipments increased over the last five years



Source: BofA Global Research estimates

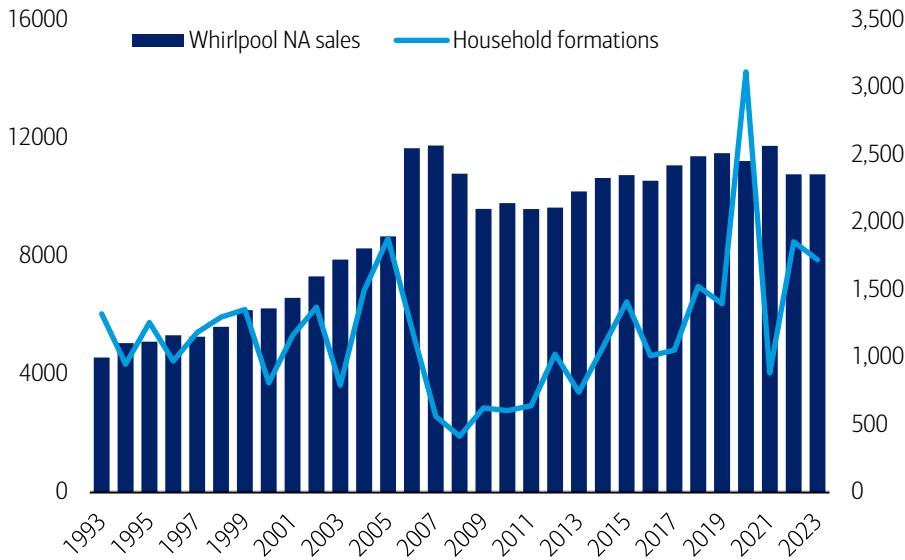
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Appliances:

Exhibit 149: Whirlpool NA sales vs Household formations

Appliances continue to trend largely in-line with household formation. Whirlpool NA sales were flat YoY in 2023 while household formation decreased by (7%).



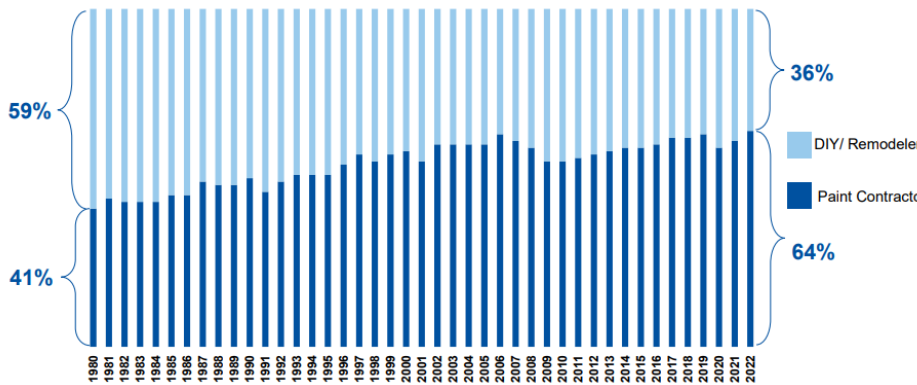
Source: Company sec, Bloomberg

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Architectural Coatings:

Exhibit 150: Share of paint gallons purchased by pros versus DIY

Pro 64% (compared to 59% in 2020); DIY 36% (compared to 41% in 2020)



Source: SHW, USDOC

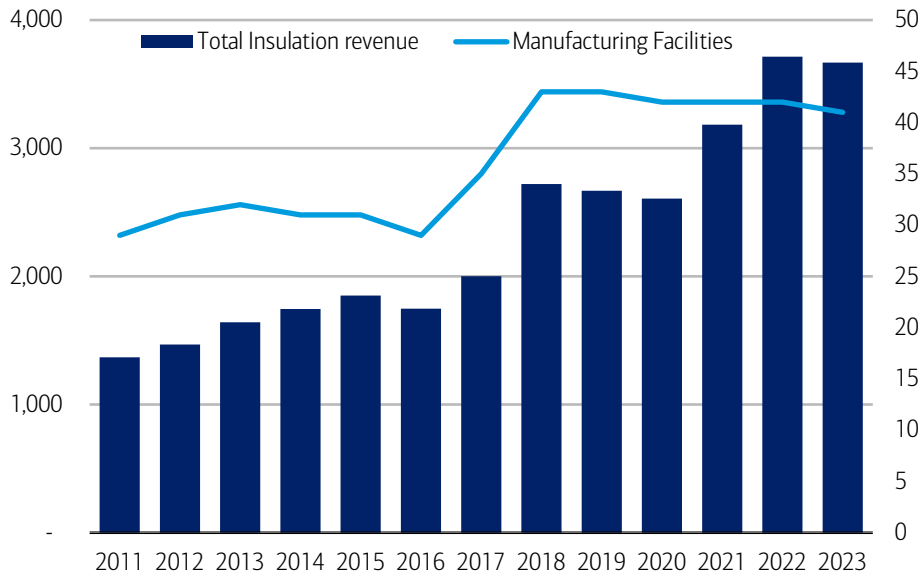
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Fiberglass Insulation

Exhibit 151: Total OC Insulation revenue vs Manufacturing Facilities

OC's insulation revenue decreased (1.2%) y/y in 2023 on one less manufacturing facility vs. in 2020/2021 (41 in 2023 vs. 42 from 2020-2022).



Source: BofA Global Research estimates; OC

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