Oaklins

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Building Products Report

Short-term challenges, sustained long-term growth

JANUARY 2023

BUILDING PRODUCTS TEAM

PAUL R. SMOLEVITZ
Managing Director
New York
T: +1 212 809 1416
psmolevitz@tmcapital.com

JONATHAN I. MISHKIN
Managing Director
New York
T: +1 212 809 1413
jmishkin@tmcapital.com

DAVID M. FELTS
Managing Director
Atlanta
T: +1 404 995 6252
dfelts@tmcapital.com

JEROME S. ROMANO
Managing Director
Boston
T: +1 617 259 2206
jromano@tmcapital.com

ANDY KRNA
Managing Director
New York
T: +1 212 809 1442
akrna@tmcapital.com

ALLAN C. CRUICKSHANKS
Managing Director
Atlanta
T: +1 804 387 4485
acruickshanks@tmcapital.com

VIDUR KAPUR
Associate Director
New York
T: +1 212 809 1422
vkapur@tmcapital.com

About TM Capital

TM Capital is a founding member of Oaklins, the world's most experienced mid-market M&A advisor, with over 850 professionals globally and dedicated industry teams in more than 45 countries. Our dedicated teams across the USA have a wide range of expertise in a number of sectors. Founded in 1989, TM Capital is the client-first investment banking team advising industry-leading companies across North America and around the world. In everything we do, our professionals share a relentless commitment to engineering extraordinary outcomes with an unmatched standard of client care. Over the last three decades, we have completed more than 350 transactions with a combined value in excess of US$25 billion. With offices in Atlanta, Boston and New York, our mission-critical capabilities include: complex mergers and acquisitions; debt and equity financings; minority and majority recapitalizations; restructurings; and board advisory services.

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Recent transactions

ALMACRAWLER

has been acquired (a majority stake) by

WISE EQUITY

M&A SELL-SIDE

Construction & Engineering Services/Private Equity

Elizabeth

has been acquired by

MOHAWK INDUSTRIES, INC.

M&A SELL-SIDE

Construction & Engineering Services

FagFlis

has been acquired by

STARK GROUP

M&A SELL-SIDE

Construction & Engineering Services

FULTON-CAPITAL

MIDWEST MEZZANINE FUNDS

have sold

RP LIGHTING · FANS

to

FERGUSON

M&A SELL-SIDE

Construction & Engineering Services

JOHNSTON QUARRY GROUP

has been acquired by

Sigma Roc

M&A SELL-SIDE

Construction & Engineering Services

KENSINGTON

has sold

WALKER

to

Ironbridge EQUITY PARTNERS

M&A SELL-SIDE

Construction & Engineering Services/Private Equity

MODULO

MY LIFE STYLE, MY DESIGN

has been acquired by

CEECAT CAPITAL

M&A SELL-SIDE

Construction & Engineering Services

SUMMER STREET CAPITAL PARTNERS

has divested the specialty lighting assets of

Halco LIGHTING TECHNOLOGIES

to

HAYWARD

M&A SELL-SIDE

Construction & Engineering Services/Private Equity

vhz GROEP

has been acquired by

Gilde EQUITY MANAGEMENT

M&A SELL-SIDE

Construction & Engineering Services/Private Equity

Introduction

Affordability challenges force prospective homebuyers into rental markets

Following a record-breaking 2021 characterized by rapidly accelerating home prices, intense competition among prospective homebuyers, and a robust wave of renovation and remodeling work, the near-term outlook for the building products sector has dampened due to a myriad of factors.

At the top of this list are interest rates, which steadily climbed throughout 2022 amid the Federal Reserve's focused efforts to tame rampant inflation. The marked rise in interest rates pushed 30-year fixed mortgage rates to over 7% as of the end of October 2022 — a level not seen since August 2008, at the outset of the Great Recession. The steep rise in interest rates has made homes less affordable, therefore cooling near-term homebuyer demand and pushing many hopeful homebuyers into rental markets. The shift in demand from buying to renting has propelled rental prices to all-time highs and stiffened competition for available properties — some metropolitan areas, such as New York City, have seen the median price for a one-bedroom rental soar as much as 40% year-over-year. Rising mortgage rates, coupled with the shift of many potential buyers to renters, slowed single-family home sales volume and diminished homebuilder sentiment in every successive month of 2022 — in turn, this has slowed the pace of single-family completions, starts and new permits. Notwithstanding these headwinds, the overall impact on the building products sector has been modest — investors have recalibrated their focus and shifted their theses, deploying more capital into multifamily projects. Investors see a stronger return potential in the multifamily sector in the near-to-medium term, given the aforementioned rising rental rates and shift away from homebuying.

PACE OF CONSTRUCTION ACTIVITY LIMITED BY MATERIAL SOURCING CHALLENGES

Near-term concerns in the building products sector are not restricted to the demand side of the equation (mortgage rates/affordability); there have been significant challenges over the last 12 to 18 months related to input material sourcing and availability. Despite the recent easing of input cost pressures, the costs of key building materials remain significantly higher than 18 months ago. The price of goods used in residential construction, as measured by the Producer Price Index, had climbed by ~6% annually as of the end of August 2022, and ~32% since January 2020, just prior to the COVID-19 pandemic. Contributing to steep price increases are meaningful supply chain disruptions, which impact the ability to procure materials. Construction inputs such as ready-mix concrete, asphalt, roofing and siding materials, and glass — which would typically take days to a few weeks to source — may now take several months to procure, slowing the pace of construction and impacting building project schedules. Further complicating project planning and budgeting has been the run-up in construction labor wages, driven by a widening gap between the demand for construction workers and labor availability — this supply-demand gap can be traced back to the housing bubble collapse of the late 2000s, and subsequent Great Recession, which resulted in an exodus of labor from the industry, which has still not fully recovered.

LONG-TERM DEMAND FUNDAMENTALS REMAIN STRONG FOR RESIDENTIAL & COMMERCIAL MARKETS

While the near-term building products outlook is facing challenges, long-term organic demand fundamentals remain strong and support a more positive outlook ahead. Most importantly, the largest potential homebuying cohort seen in American history — younger Millennials and Gen Z (collectively, individuals born between ~1990 and 2020) — are set to exceed the current median homebuying age over the next two decades.

These generations have made clear their inclination to achieve the so-called American Dream of homeownership — many members of these cohorts are in the early stages of professional careers and are making concerted efforts to financially position themselves to become homeowners. Meeting the overwhelming demand resulting from over 100 million younger Millennials and Gen Zers in the medium-to-long term will require a significant expansion in the supply of both single-family and multifamily housing. Due to the building slowdowns that originated with the housing bubble collapse and the fact that single-family starts have not yet reached the pre-Great Recession peak level, current estimates pin US housing supply at nearly six million units short of demand, with the impending wave of potential new homeowners set to further widen the gap. Not only will tens of millions of new homebuyers necessitate significant new residential construction, but this demand will continue to fuel the already hot remodeling market. Given the limited supply of available-for-sale homes, overlaid with current slowdowns in new residential construction, many homeowners are hesitant to embark on a sell-and-buy housing journey, and are instead opting to remodel and reconfigure their existing residence. Likewise, with intense competition and continually rising new-home prices, prospective first-time homebuyers will in many cases be forced to upgrade older homes through renovation, rather than purchase newly built or already renovated homes.

In addition to long-term demand drivers for residential construction, the commercial construction market is also positioned for strong activity moving forward. The economic shift toward the e-commerce channel, growing internet/technology usage and medical innovation have all altered the aggregate demand profile for commercial spaces. What were once prevalent uses of commercial space, such as office buildings and malls, have fallen out of favor. Commercial property owners are in the early stages of retrofitting, remodeling and repurposing commercial space to meet the emerging space requirements of the modern economy, which is calling for a steep expansion in square footage dedicated to warehouses/industrial facilities, data centers, biomedical/research facilities and multifamily housing.

Both public equity performance and private equity activity slumped throughout the second and third quarters of 2022, following an 18-month period of record-breaking performance. Near-term headwinds — interest rates, inflation, home affordability, input costs and delays — are weighing on markets, dampening equity valuations and slowing M&A volume. However, long-term demand fundamentals remain intact, and support a brighter market outlook once these near-term headwinds recede.

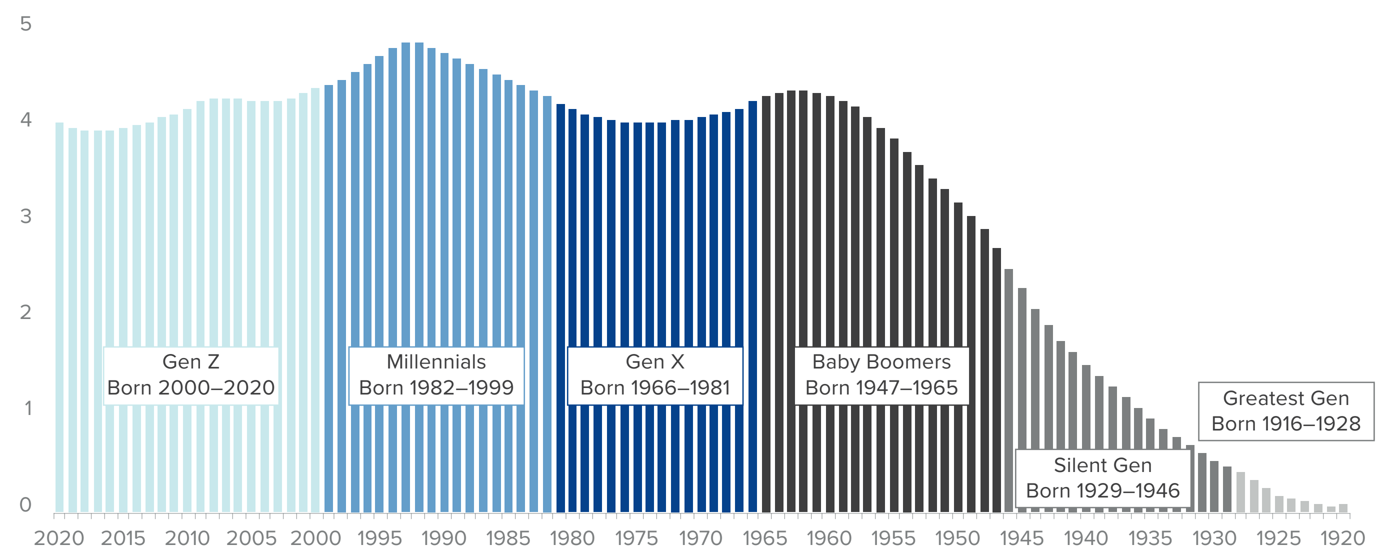
Residential market trends

Long-term demand, short-term headwinds

LONG-TERM RESIDENTIAL HOUSING DEMAND FUNDAMENTALS CONTINUE TO BE BUOYANT

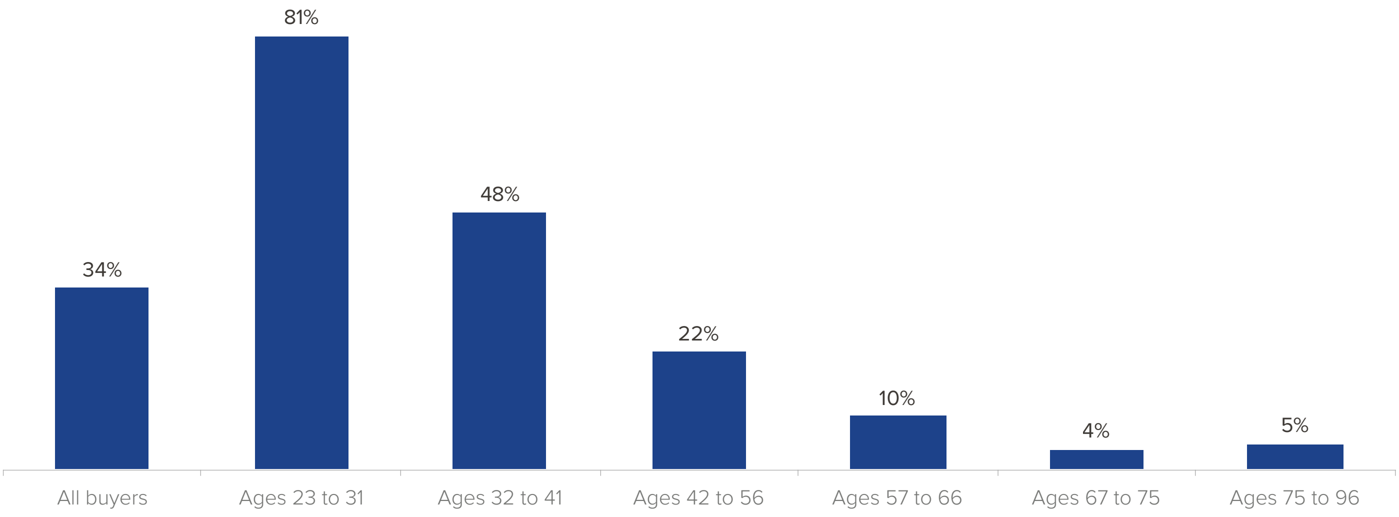
Despite short-term challenges largely centered around affordability and availability, the long-term demand outlook for the residential housing market remains robust. Both younger Millennials and Gen Zers, an overall cohort totaling more than 100 million individuals, are set to cross the median homebuying age of 34 by the year 2040 — with both cohorts evidencing strong interest in homeownership. Given the severely limited housing inventory, this population-driven demand for homeownership will necessitate significant increases in the supply of residential housing, thus supporting investment in the building products and related sectors for years to come.

Total US population by birth year (millions of people)



Source: Knoema

Proportion of first-time US homebuyers by age group



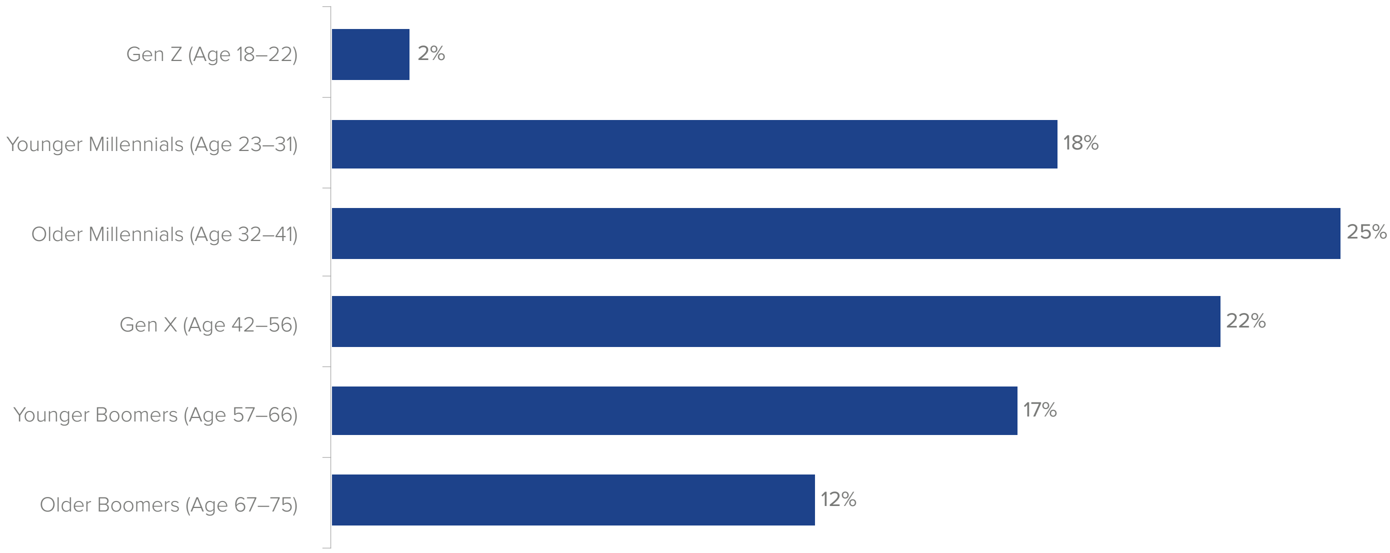
Source: National Association of Realtors

SIZEABLE MILLENNIAL COHORT CONTINUES TO ENTER HOMEBUYING MARKET

Millennials have entered the homebuying market in force in recent years, and have quickly become the largest homebuying cohort. Millennials, loosely defined as those born between 1982 and 1999, are increasingly becoming the dominant homebuying cohort, having accounted for 43% of all homebuyers during 2022 as of October, according to the National Association of Realtors.

The median first-time homebuyer age in the USA is 34 — a threshold which roughly 47 million Millennials will surpass in the decade spanning 2021 to 2030. This represents a 15.5% increase over the previous 10-year span, or 6.3 million individuals. With 88% of Millennials saying that they view a home purchase as a good investment, the result will be tens of millions of first-time homebuyers over the next decade.

Share of US homebuyers by generation (percentage distribution)

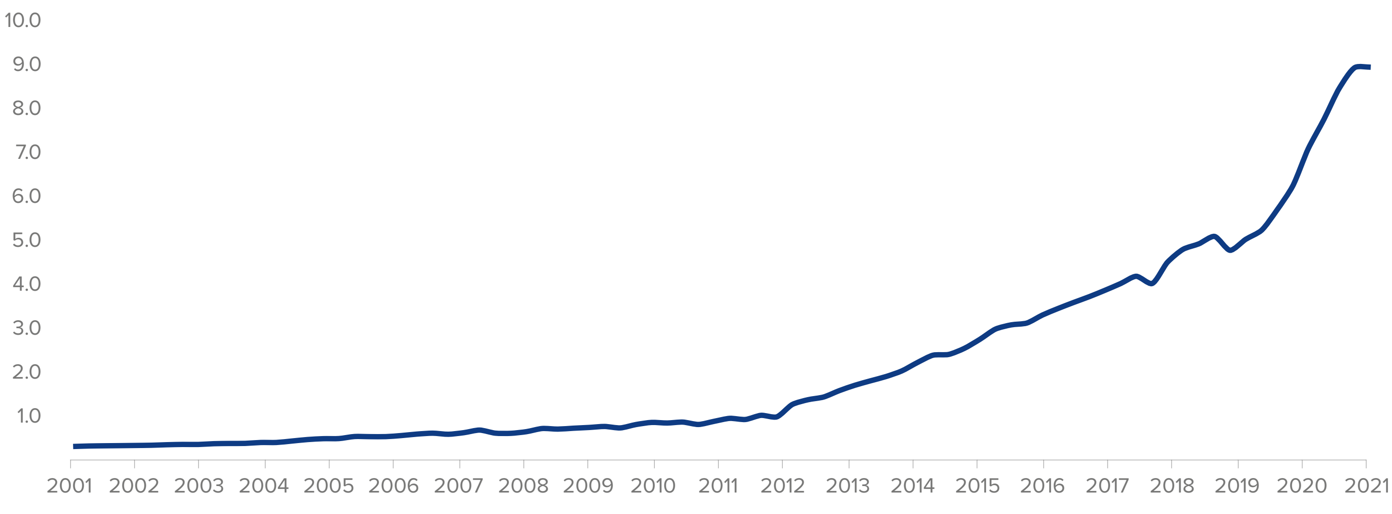


Source: National Association of Realtors

Not only are Millennials approaching the expected first-time homebuying ages in never-before-seen volumes, but they are entering the market with the financial wherewithal to make their presence felt. The two most frequently cited barriers to first-time home purchases for Millennials are: (i) cash for a down payment, and (ii) debt, particularly of the student loan variety — 45% of younger Millennials have reported having student loan debt with a median loan balance of US$28,000. However, Millennials have been able to capitalize on a silver lining of the COVID-19 pandemic, as many opted to move in with parents, therefore saving on rent and bolstering their financial position via increases to savings and/or paydown of debt, while also benefiting from over two years of frozen student loan payments. Further, many of these same Millennials stand to benefit from the Biden Administration's proposal for student loan forgiveness, which includes reduced monthly payment ceilings and up to US$10,000 in relief to borrowers whose loans are held by the Department of Education. Overall, US Millennial wealth has more than doubled since the outbreak of the pandemic, from US$4.8 trillion at the end 2019 to US$8.6 trillion at the end of the first quarter of 2022, according to the Federal Reserve. This nearly 80% wealth increase far surpasses that of the Baby Boomer generation, which saw its wealth increase just 25% over the same period.

> "Some young adults have used the pandemic to their advantage by paying down debt and cutting the cost of rent by moving in with family. They are now jumping headfirst into homeownership."
>
> **JESSICA LAUTZ**
> NAR'S VICE PRESIDENT
> OF DEMOGRAPHICS AND BEHAVIORAL INSIGHTS

US Millennial net worth (US$ in trillions)



Source: Federal Reserve

In addition to personal improvements to their financial position, some Millennials are benefiting from the financial success of their parents and grandparents, most of whom are classified generationally as Baby Boomers. Historically, US wealth has seen an even distribution across age groups; however, this has shifted over the last 30 years according to Federal Reserve data, whereby older generations have amassed wealth at a far greater rate than younger generations, largely due to real estate ownership. In 1998, the American population under 40 years old held ~13% of the nation's wealth but holds only ~6% today. Millennials own just 5% of the nation's wealth, while their Baby Boomer counterparts own over 52%.

Much of this wealth is attributable to real estate ownership, as the gap in real estate assets alone between Millennials and Baby Boomers is valued at over US$11 trillion, with Baby Boomers owning ~44% of the nation's real estate by value. Baby Boomers are not keeping their successes to themselves, however they are "spreading the wealth" — many experts have observed that Millennial homebuyers have assistance from parents with cash on hand to help with a down payment. According to the National Association of Realtors (NAR), 25% of homebuyers aged 23 to 31 received down payment help from a close relative or friend.

> "Millennials have income, but they can't do down payments. However, many have Baby Boomer parents giving gifts for down payments. Every single Millennial I've worked with has Baby Boomer parents in their ear. They're telling them the win is getting into a home, and they're having to relinquish their desire to have that home be perfect."
>
> **CYNTHIA LIPPERT**
> PRESIDENT OF
> ATLANTA REALTORS ASSOCIATION

"ON-DECK" GEN Z DEMONSTRATING INTEREST IN HOMEOWNERSHIP

Following closely in the footsteps of the Millennial generation, is the nearly-as-large Gen Z cohort, comprised of ~68 million individuals and defined as those born between 2000 and 2020. Gen Z is a group that sociologists generally view as possessing a more positive outlook than their Millennial counterparts, who endured significant student loan debt and challenges finding suitable employment to start their careers, leading to a more risk-averse mentality and a delayed entrance into the homebuying market. At the age of 30, just 42% of Millennials owned homes, compared to 48% of Gen Xers and 51% of Baby Boomers at the same age. Similarly, as of 2019, just 3.9% of residential housing stock was owned by people under the age of 30, down from 6.3% in both 2009 and 2001, and 5.7% in 1993.

> "Gen Z is going to buy at a younger age, we believe, than the Millennial generation, partially because of wanting to move out to suburbia, and they believe that real estate is a good investment."
>
> **ELLEN STEINFELD**
> EXECUTIVE VICE PRESIDENT AT BERKSHIRE BANK

Most experts predict Gen Z will make an earlier entrance into the homebuying market than their Millennial counterparts. Gen Z's dream of homeownership is nearly universal and is expected to sustain the mortgage and housing market for years following the wave of Millennial homebuying. Gen Z-focused research and advisory firm Gen Z Plane recently found that 87% of Gen Zers would like to own a home in the future, with 68% of them viewing homeownership as a strong way to build personal wealth, compared to 60% of Millennials believing the same. Not only do Gen Zers aspire to become homeowners — they are acting on these hopes and desires earlier than their Millennial counterparts. Despite the fact that "older" Gen Zers remain recent entrants to the American workforce and are far short of their prime earning years, many Gen Zers are making concerted efforts to spend smart and save or invest money — 85% of the cohort are putting aside an average of 32% of their US$360 billion in aggregate income, per US government data. The combination of strong desires for homeownership and early financial planning have led experts to believe Gen Z will make a larger and earlier homebuying splash relative to their Millennial peers.

> "Gen Z is no stranger to financial difficulties or challenges because they lived through the peak of the 2008 recession, and they are fearless graduates of the global pandemic, but even with that, they actually are very determined to handle these experiences and secure their future by taking calculated risk."
>
> **HANA BEN-SHABAT**
> FOUNDER OF RESEARCH AND ADVISORY FIRM, GEN Z PLANET

Research from Realtor.com indicates that nearly 29 million Gen Zers could own a home as early as 2026

SHIFTING MIGRATION PATTERNS ARE IMPACTING THE HOUSING MARKET

Due to evolving dynamics related to the economy, remote work and living preferences, American population movement is undergoing a paradigm shift. More than 35 million Americans changed addresses in 2021 — including both permanent and temporary changes. A predominant driver of migration dynamics is the growth of remote work opportunities. In 2022, more than 40% of remote workers expected to continue working remotely or follow a hybrid model, as opposed to returning to in-person work full-time. With those engaging in remote work no longer tethered to the high housing costs of dense labor markets, a large portion of these individuals are taking the opportunity to move to more affordable areas. As more Americans experience remote work, its desirability increases — the lack of commute saves workers time and money, and flexible work schedules allow employees to prioritize family, health and other activities.

As they relocate, Americans are prioritizing affordability, space and lifestyle. With an economy that is still recovering from shocks catalyzed by the COVID-19 pandemic, and inflation running at 40-year highs, many Americans are looking to move to a different state or city with lower living and housing costs. Finances (i.e. tightening budgets), largely driven by increasing living expenses, were the primary reason behind American relocations in 2021, with nearly half of Americans lacking emergency funds to cover high-cost living expenses. Additionally, many homebuyers purchased homes with more space (both inside and out) in 2021, a trend that continued through 2022. Many who considered moving sought homes with desirable amenities including yard space, porches, home offices, spaces for remote learning and home gyms. To find this space at a more affordable cost, many Americans opted to move to less dense areas, favoring suburban towns over urban living. An examination of US moving patterns revealed a nationwide shift from downtown communities to the surrounding suburbs, indicating a rise in desirability for suburban living — 82% of US urban areas have seen more people moving out, while suburban areas have seen more people moving in. Americans have flocked to places like Vermont, South Dakota and Idaho, which are among the least populated states in the country and are more affordable than more densely populated areas. Conversely, Illinois, New Jersey and New York, which are among the top states for departures, have historically been the most densely populated and expensive states in the country.

> "Moving across the country is now easier for many Americans, thanks to remote work. That cultural shift is here to stay."
>
> **TAYLOR MARR**
> REDFIN DEPUTY CHIEF ECONOMIST

"The data is indicative of COVID-19's impact on domestic migration patterns, with 2021 bringing an acceleration of moves to smaller, midsized towns and cities. We're seeing this not only occur because of Americans' desire to leave high-density areas due to the risk of infection, but also due to the transformation of how we're able to work, with more flexibility to work remote."

MICHAEL STOLL
ECONOMIST AND PUBLIC POLICY PROFESSOR AT THE UNIVERSITY OF CALIFORNIA–LOS ANGELES

Top 10 inbound/outbound states in 2021*

Top states people moved away from	
New Jersey	71%
Illinois	67%
New York	63%
Connecticut	60%
California	59%
Michigan	58%
Massachusetts	58%
Louisiana	57%
Ohio	56%
Nebraska	56%

Top states people moved to	
Vermont	74%
South Dakota	69%
South Carolina	63%
West Virgina	63%
Florida	62%
Alabama	62%
Tennessee	62%
Oregon	61%
Idaho	60%
Rhode Island	59%

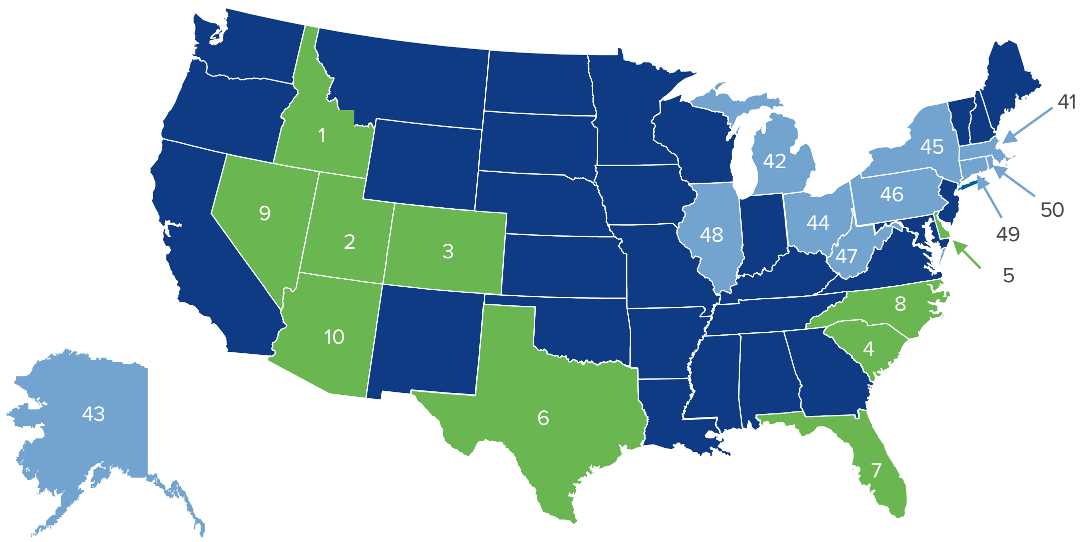
Source: New York Times

* Inbound/outbound percentage defined as the proportion of movers undertaking the specified action. For example, New Jersey's 71% outbound percentage indicates that of all moves involving New Jersey, 71% were outbound moves, while 29% were inbound moves.

Housing development, measured by home building permits per capita per state, closely mirrors recent American migration patterns. Idaho, a burgeoning destination in the American West, ranked in the top 10 states in 2021 for inbound migration and saw the greatest number of permits issued per capita between 2015 and 2020, at 7.17 permits per 1,000 residents, followed closely by Utah with 7.05 permits issued per 1,000 residents. Colorado, South Carolina and Delaware round out the top five for states where the most housing development per capita is occurring, while Michigan, Connecticut, Illinois, Massachusetts and New York — all states toward the top of the list for outbound migration — rank among the bottom five for home building permits per capita.

Top 10 & bottom 10 states for home development (2015–2020)

State	Rank	Permits issued per 1,000 residents	Total permits issued	Percentage increase of permits issued
Idaho	1	7.17	84,154	798%
Utah	2	7.05	151,217	694%
Colorado	3	6.34	245,673	691%
South Carolina	4	5.90	208,451	593%
Delaware	5	5.81	38,868	633%
Texas	6	5.56	1,122,032	545%
Florida	7	5.49	800,020	641%
North Carolina	8	5.42	388,071	625%
Nevada	9	5.20	107,560	664%
Arizona	10	5.16	249,513	709%
Massachusetts	41	1.92	96,269	464%
Michigan	42	1.81	130,662	491%
Alaska	43	1.77	9,130	607%
Ohio	44	1.75	141,986	624%
New York	45	1.65	271,735	255%
Pennsylvania	46	1.52	139,226	519%
Virginia	47	1.44	18,600	534%
Illinois	48	1.41	127,817	556%
Connecticut	49	1.25	32,648	455%
Rhode Island	50	0.99	7,285	636%

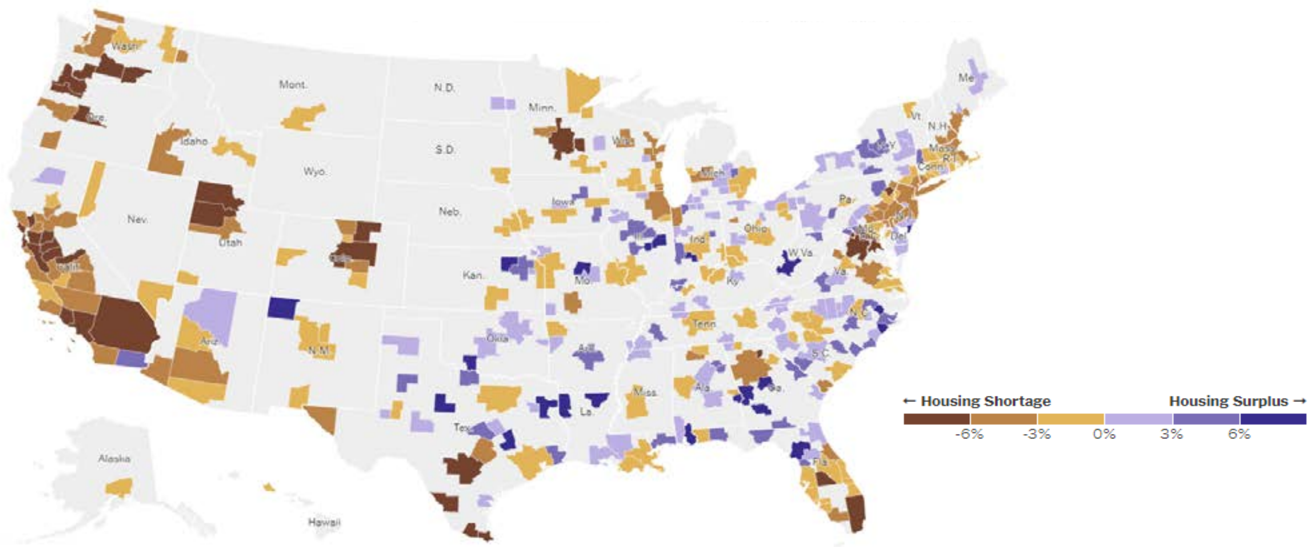


Source: Bigrentz.com

US metropolitan areas with housing shortage & supply heat map

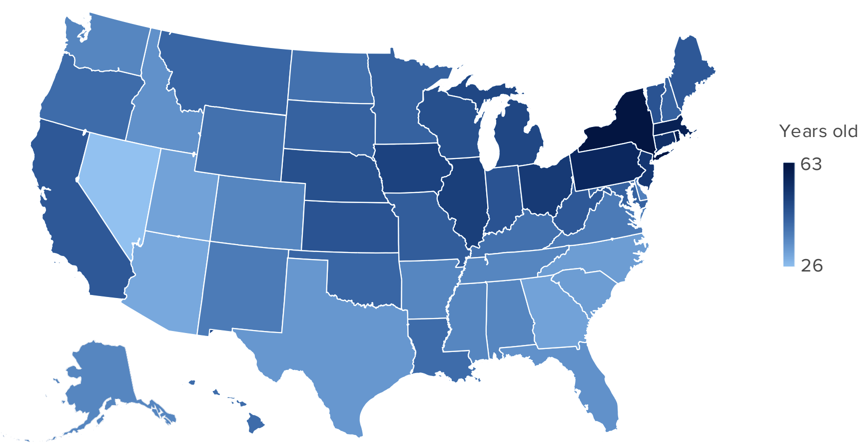
Metro areas without enough housing that lost big surpluses		
Metro area	**2012 surplus**	**2019 shortage**
Athens-Clarke County, Ga.	12.0%	(2.4%)
Punta Gorda, Fla.	7.7%	(1.3%)
Hilton Head Island-Bluffton, S.C.	6.5%	(3.3%)
Pensacola-Ferry Pass-Brent, Fla.	6.5%	(0.4%)
Cape Coral-Fort Myers, Fla.	6.2%	(2.8%)
Muskegon, Mich.	4.9%	(1.7%)
Auburn-Opelika, Ala.	4.9%	(0.9%)
New Orleans-Metairie, La.	4.4%	(1.6%)
Las Vegas-Henderson-Paradise, Nev.	4.2%	(2.7%)
Palm Bay-Melbourne-Titusville, Fla.	4.1%	(2.3%)
Yuma, Ariz.	4.0%	(3.2%)
St. George, Utah	3.8%	(3.0%)
Prescott Valley-Prescott, Ariz.	3.7%	(2.8%)
Tampa-St. Petersburg-Clearwater, Fla.	3.6%	(0.9%)
Kankakee, Ill.	3.5%	(2.1%)

Metro areas with big shortages that once had enough housing		
Metro area	**2012 surplus**	**2019 shortage**
Merced, Calif.	1.9%	(8.7%)
Bend, Ore.	2.1%	(8.2%)
Lakeland-Winter Haven, Fla.	3.3%	(7.8%)
Stockton, Calif.	0.0%	(6.6%)
Phoenix-Mesa-Chandler, Ariz.	1.9%	(5.8%)
Vallejo, Calif.	0.8%	(5.4%)
Coeur d'Alene, Idaho	0.3%	(5.3%)
Fresno, Calif.	0.1%	(5.2%)
Appleton, Wis.	0.5%	(5.2%)
Racine, Wis.	2.1%	(5.0%)
Green Bay, Wis.	0.6%	(4.9%)
Naples-Marco Island, Fla.	1.2%	(4.8%)
Sheboygan, Wis.	0.2%	(4.5%)
Bakersfield, Calif.	0.9%	(4.5%)
Yuba City, Calif.	2.1%	(4.5%)



Source: Bigrentz.com

Median home age by state



Source: House Method

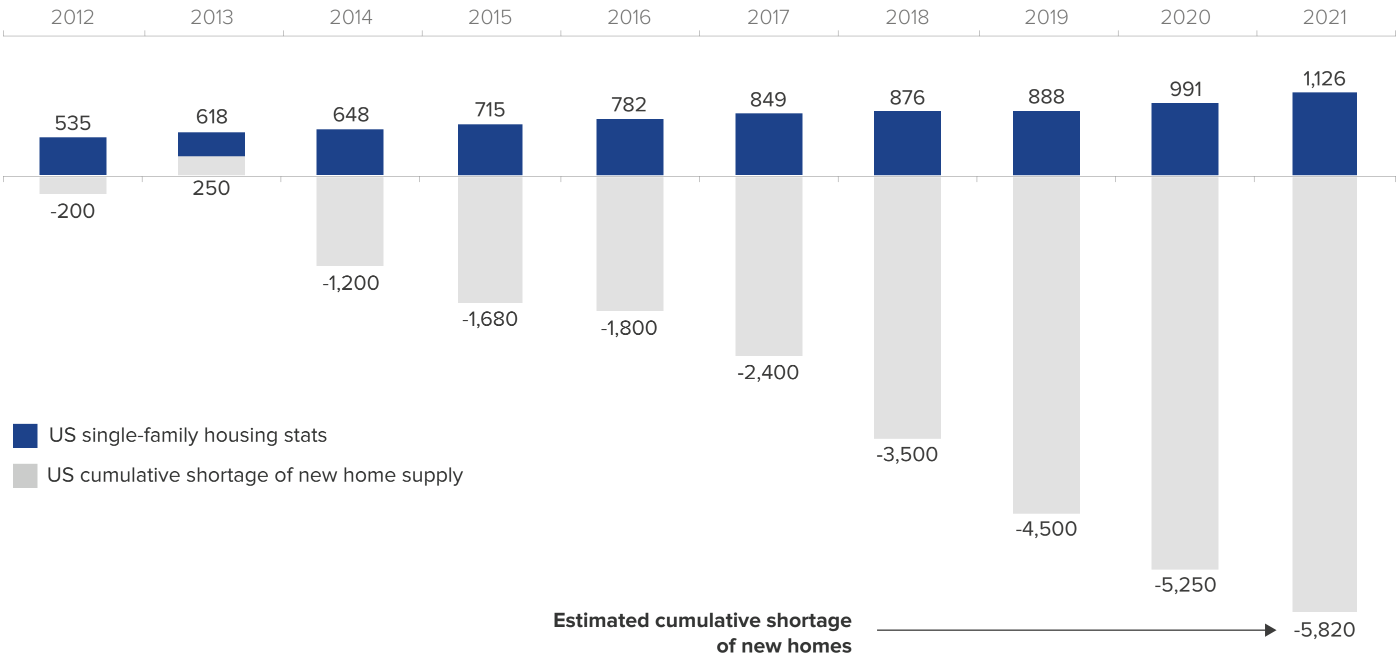
SUPPLY DEFICIT REMAINS STEEP, SUBJECT TO SHORT-TERM CHALLENGES

While long-term housing demand fundamentals remain strong, there is still a significant home supply shortage, and near-term challenges are impacting the country's ability to alleviate the supply-demand imbalance. Realtor.com estimated that the nation sat 5.8 million housing units short on supply, measured against the levels and rate of household formation, as of the end of 2021. The shortage is largely an issue of historical underbuilding that can be traced all the way back to the 2008 housing bubble, when new home building and permits collapsed. A few years after that collapse, Americans started buying homes again, but building levels remained well below the historical norm, a trend that has continued through today. Up For Growth, a Washington-based policy and research group focused on the housing shortage, estimates that the national housing deficit doubled from 2012 to 2019. This supply-demand squeeze on American housing was once considered a problem of wealthy coastal cities, primarily San Francisco, Los Angeles, Washington and New York, but has now spread and is a nationally recognized issue — from 2012 to 2019, the supply-demand imbalance worsened in 47 states and the District of Columbia, while 75% of 310 metro areas studied nationwide experienced worsening shortages leading up to the pandemic, driven by surging demand, the rising proliferation of remote work, low interest rates and a rising cohort of Millennials and older Gen Zers entering their prime homebuying years. The supply situation has been particularly challenging to correct, due to input challenges including rising material costs, rising costs for skilled construction labor, reduced labor availability and significant material lead time delays, driving up home prices and diminishing the fervent pace of sales.

US single-family housing starts & permits over time (in thousands)

Source: FRED

US single-family housing starts & cumulative supply shortage (homes in thousands)

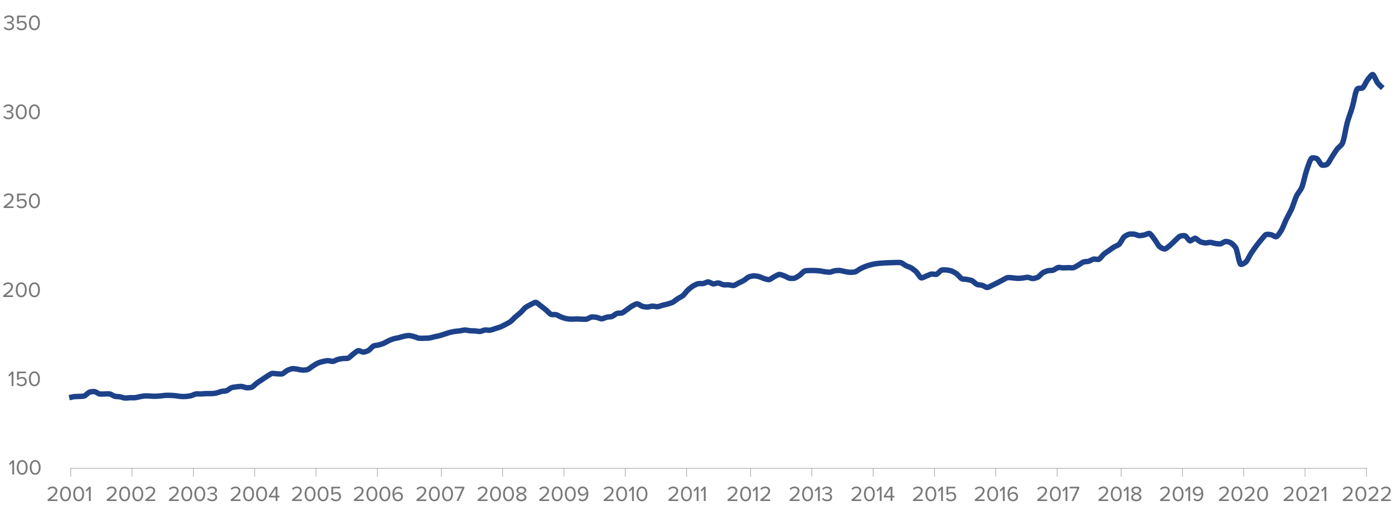


Source: FRED

MATERIAL SLOWDOWNS, RISING COSTS AND LABOR SHORTAGES...

A myriad of supply-side challenges — rising material costs, increased costs for skilled construction labor, low labor availability and significant building material lead time delays — have slowed the release of new home supply to the housing market. Homebuilding material costs across the board have been subject to sizeable price increases and lead time delays of over 18 to 24 months, while labor remains in short supply. Over the past two years, the cost to build a home has risen at an unprecedented rate, with most estimates pinning the cost increase at ~40% for the average home, primarily driven by challenges within the supply chain. While cost pressures have eased slightly over the past few months, they remain elevated relative to historical levels. According to the Producer Price Index, the price of goods used in residential construction had increased ~6% year-over-year as of August 2022, and nearly 32% since January 2020.

US Producer Price Index: net inputs to residential construction



Source: FRED

Not only have material costs undergone significant price pressures, but homebuilders are also dealing with untimely delays — 93% of homebuilding firms surveyed by Zonda in early 2022 said they were experiencing significant supply disruptions. Material delivery times have increased substantially as global supply chains were unsettled by the COVID-19 pandemic and are not yet fully repaired. Prior to COVID-19, the lead time for ready-mixed concrete was one to two days, now it is one to two weeks. Further, lead times for steel and pipe were previously four to eight weeks, now they are four to five months, with few signs of improvement in the near term, according to Cumming Insights. A large part of the issue resides in China, where slowdowns and/or pauses to production have limited supply, and costs for shipping containers have increased expenses. The cost for a shipping container from China to the east coast of the USA has climbed more than 500% from pre-pandemic levels, which is a challenge for US builders who look to China to source everything from steel and stone to millwork and plumbing fixtures. Estimates say 30% of all US building product imports come from China, but some American construction firms rely on China for as much as 80% of their materials.

Increases in construction material lead times due to COVID-19

Construction input	Pre-COVID-19 expected delivery time	Current expected delivery time
Prestressed concrete products	3–4 months	6–7 months
Asphalt roofing & siding	2–4 weeks	2–3 months
Concrete block & brick	2–4 weeks	3–6 weeks
Ready-mixed concrete	1–2 days	1–2 weeks
Precast concrete products	2–4 weeks	4–6 weeks
Brick and structural clay tile	3–4 weeks	16–20 weeks
Flat glass	3–4 weeks	8–16 weeks
Gypsum products	3–4 weeks	5–6 weeks
Insulation materials	2–4 weeks	4–5 months
Steel, pipe & tube	4–8 weeks	4–5 months
Aluminum mill shapes	4–8 weeks	4–5 months
Sheet metal products	2–4 weeks	4–6 weeks
Fabricated structural steel	6–8 weeks	5–6 months
Metal bar joists and rebar	2–3 months	6+ months
Construction machinery equipment		12 months for AHUs 18 weeks for generators 8 weeks for lighting 22 weeks for switchgear 25 weeks for env. cold rooms 18–20 weeks for lab casework

Source: Cumming Insights

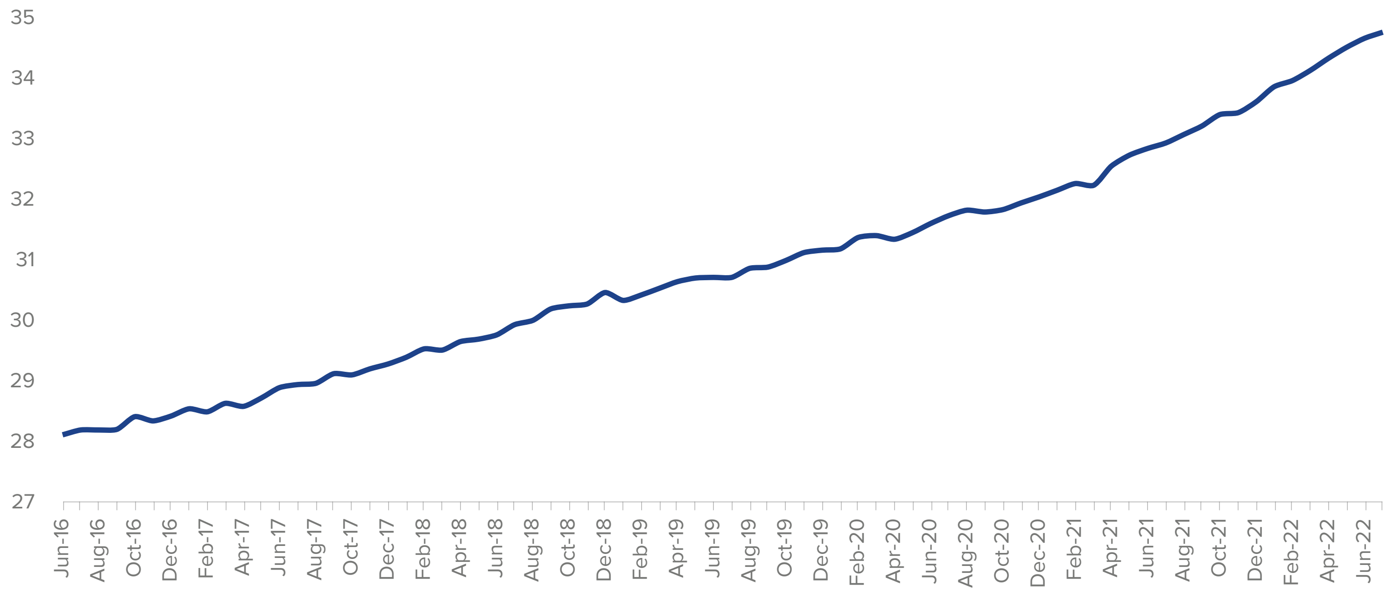
"The way homebuilders describe the supply chain right now is whack-a-mole, where every time they find one thing that they fix, another one pops up… there's always a new category that's creating the bottleneck."

RAFE JADROSICH
ANALYST AT BANK OF AMERICA

> "I had a client ask me to add a door. We just waited six months to get it. That's a door in a frame, that's kind of crazy. A dishwasher, if you can find the model you want right now, you might wait a year for it."
>
> **EMERSON CLAUS**
> HOMEBUILDER FOR 45 YEARS

Labor shortages and higher costs have only further complicated the homebuilding input environment. There has been a significant shortage of skilled construction laborers in the USA since the housing bubble collapse of 2008. According to a model developed by Associated Builders and Contractors, the construction industry needed to attract nearly 650,000 additional workers on top of the normal pace of hiring in 2022 to meet the demand for construction labor. A similar estimate from the US Bureau of Labor Statistics reckons that the industry will need an additional 747,000 workers by 2026. The shortage in skilled construction labor has resulted in larger paychecks across the board — average hourly earnings in construction, a measure of all wages and salaries, had increased ~5% year-over-year, and ~12% since January 2020, to US$34.82 as of August 2022.

Average hourly earnings of US construction laborers (in US$)



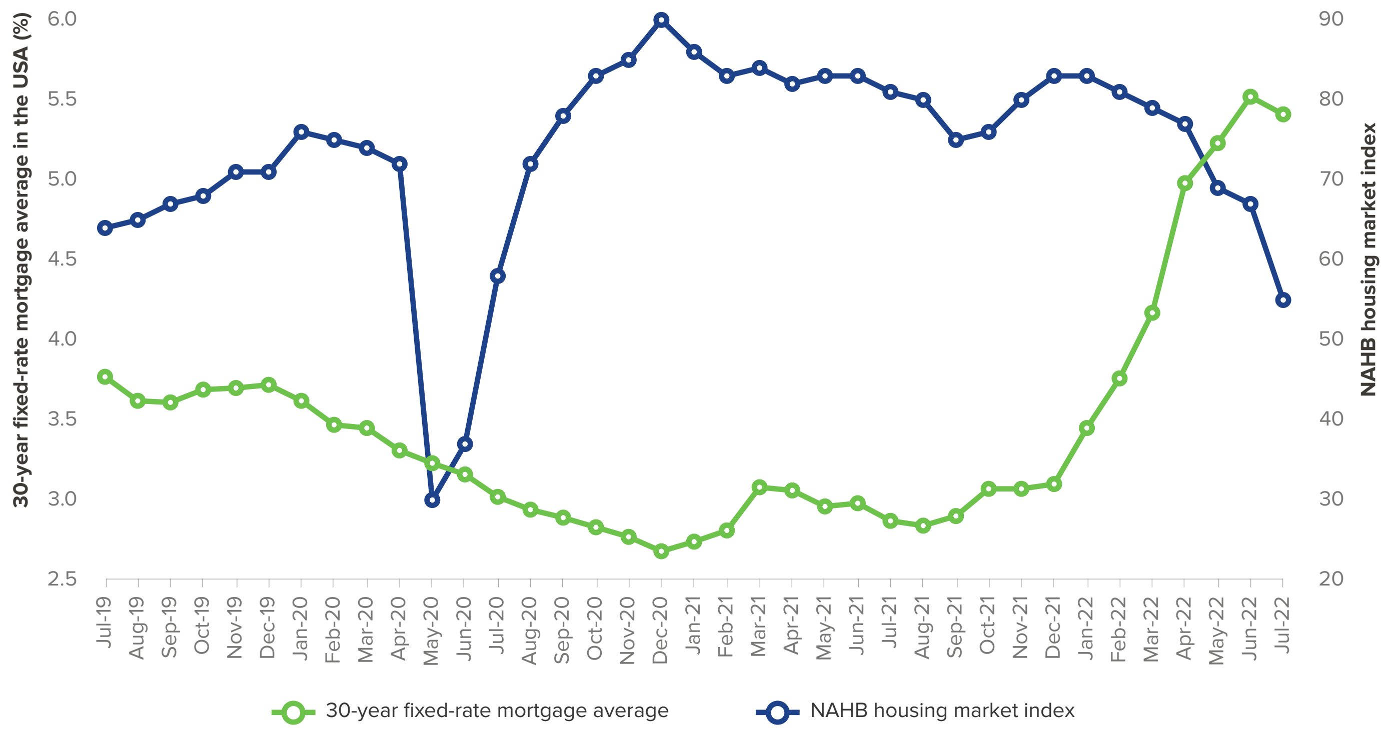
Source: FRED

> "The workforce shortage is the most acute challenge facing the construction industry."
>
> **ANIRBAN BASU**
> ABC CHIEF ECONOMIST

...RESULTING IN DECLINING HOMEBUILDER CONFIDENCE AND SLOWDOWNS IN BUILDING

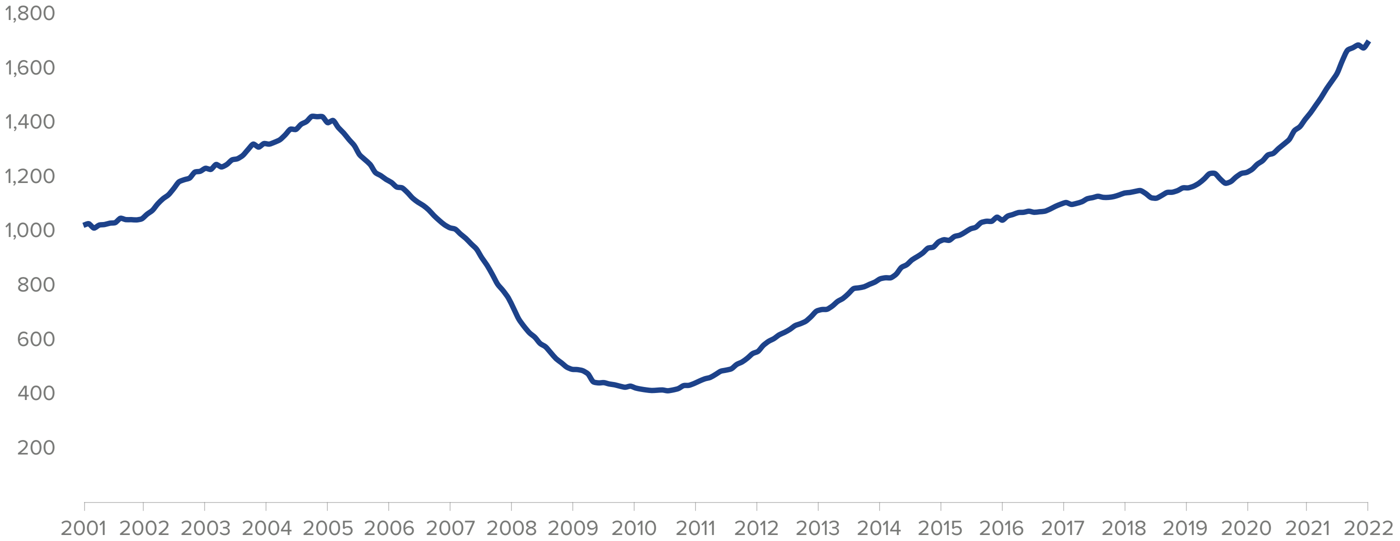
The combination of reduced affordability and input-related challenges in the housing market has pushed homebuilder confidence down. It fell by three points in September 2022, following a six-point decline in August and 12-point decline in July, to a reading of 46 on the NAHB/Wells Fargo Housing Market Index (HMI) — the ninth straight month of decline. The Index's August reading of 49 marked the first time since May 2020 that the index had fallen below the key break-even measure of 50 — a month earlier, July's 12-point drop represented the largest one-month drop in the history of the HMI (aside from the 42-point drop in April 2020). Lower homebuilder confidence has resulted in a sharp decline in the rate of homebuilding — US homebuilding activity fell to an 18-month low in July and only modestly rebounded in August, the latest indication of a cooling housing market. Single-family homebuilding activity sits near two-year lows across the board as of the end of August, with the near-term outlook slumping as well — building permits for authorized new single-family builds registered 899,000 in August, 14.4% below the rate in the same month of 2021. Further, the number of single-family homes under construction but not yet completed came in at 812,000 — the seventh straight month of record or near-record highs, a clear signal of the difficulty builders are facing finishing projects on schedule with materials and labor in short supply.

US mortgage rates & NAHB/Wells Fargo Housing Market Index over time



Source: FRED

US privately owned housing units started, but not yet completed (in thousands)

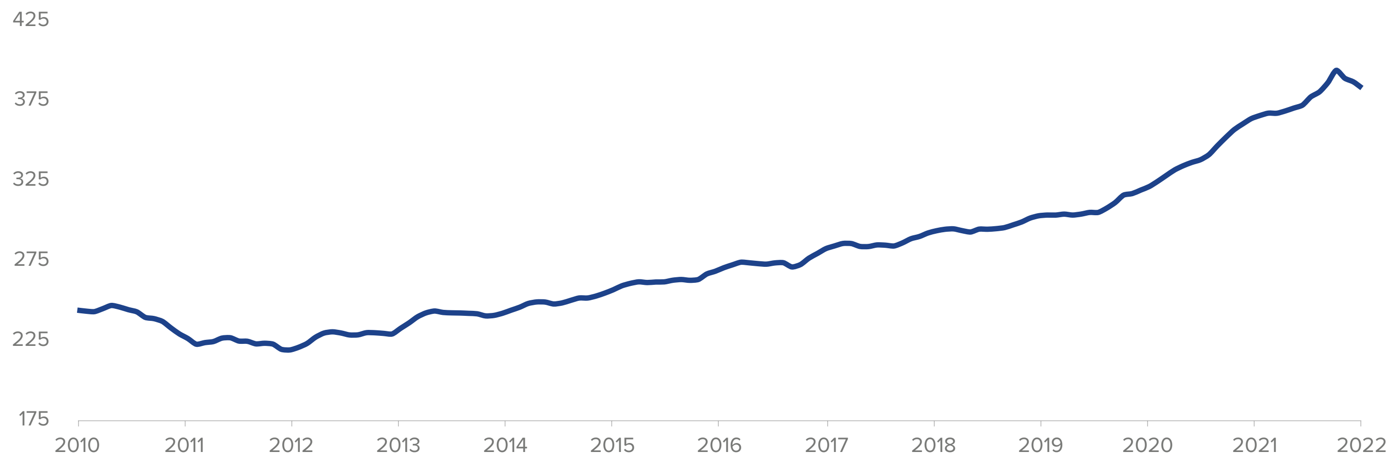


Source: FRED

SHORT-TERM DEMAND CHALLENGES AND LIMITED INVENTORY UNDERPIN THE REMODELING & MULTIFAMILY MARKET

Challenges related to near-term housing supply have been compounded by increases in interest rates which have dampened homebuyer demand by reducing affordability. Mortgage rates have spiked to the highest levels since the 2008 housing crisis, driven by the Federal Reserve's attempt to tame the highest levels of inflation seen in over 40 years. Housing, unlike many areas of the economy, is highly sensitive to fluctuations in interest rates, and typically plays a large role in economic downturns. The interest rate on the 30-year mortgage had risen to over 7% as of the end of October 2022, a steep increase from the ~3.5% level at the beginning of the year. Simultaneously, home prices have risen nearly 40% over the past two years in much of the country, further reducing the affordability of homeownership for many Americans.

Median US home price over time (US$ in thousands)



Source: DQYDJ

The run-up in mortgage rates, combined with record-high home prices, has expanded monthly mortgage payments and pushed aspirational homebuyers toward their financial limits. With the typical homebuyer making about US$70,000 annually according to Moody's Analytics, and in 2022 increases in mortgage rates adding roughly US$800 to the average monthly mortgage payment, many prospective homebuyers simply cannot afford to make the purchase. New "priced-out" estimates from the National Association of Homebuilders show that an estimated 87.5 million households, or 69% of all US households, are not able to afford the median-priced new home, and that ~120,000 additional households would be priced out of the new home market if the price of that home were to increase by just US$1,000. Unfortunately, due to clustering effects, it is those at the lower end of the income distribution curve that are most sensitive to interest rate increases. Yardeni's Housing Affordability Index, which measures national homeownership affordability based on income, home price and mortgage rate inputs, demonstrates this trend — the index currently sits at its lowest level since the turn of calendar year 2006 to 2007, just prior to the collapse of the housing market.

"Affordability is the greatest challenge facing the housing market. Significant segments of the homebuying population are priced out of the market."

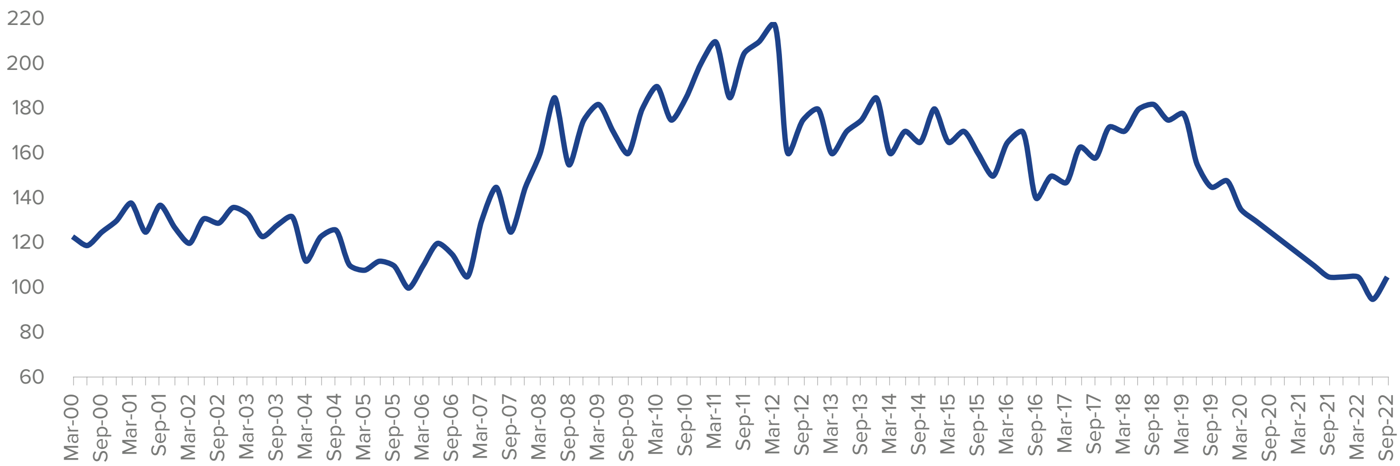
ROBERT DIETZ

NAHB CHIEF ECONOMIST

"Priced-out" table — change in mortgage rates vs. households

Mortgage rate	Median new house price	Monthly mortgage payment	Taxes and insurance	Minimum income needed	Households that can afford house	Change in households	Cumulative change
1.50%	US$412,505	US$1,415	US$493	US$81,775	50,566,246		
1.75%	US$412,505	US$1,463	US$493	US$83,820	49,210,076	(1,356,170)	(1,356,170)
2.00%	US$412,505	US$1,512	US$493	US$85,905	47,827,984	(1,382,092)	(2,738,262)
2.25%	US$412,505	US$1,561	US$493	US$88,028	46,420,275	(1,407,709)	(4,145,971)
2.50%	US$412,505	US$1,612	US$493	US$90,189	44,987,280	(1,432,995)	(5,578,966)
2.75%	US$412,505	US$1,663	US$493	US$92,388	43,529,350	(1,457,930)	(7,036,896)
3.00%	US$412,505	US$1,715	US$493	US$94,624	42,046,857	(1,482,493)	(8,519,389)
3.25%	US$412,505	US$1,768	US$493	US$96,896	40,540,195	(1,506,662)	(10,026,051)
3.50%	US$412,505	US$1,822	US$493	US$99,204	39,205,373	(1,334,822)	(11,360,873)
3.75%	US$412,505	US$1,877	US$493	US$101,548	38,056,255	(1,149,118)	(12,509,991)
4.00%	US$412,505	US$1,932	US$493	US$103,926	36,890,209	(1,166,046)	(13,676,037)
4.25%	US$412,505	US$1,988	US$493	US$106,337	35,707,574	(1,182,635)	(14,858,672)
4.50%	US$412,505	US$2,045	US$493	US$108,782	34,508,699	(1,198,875)	(16,057,547)
4.75%	US$412,505	US$2,103	US$493	US$111,259	33,293,939	(1,214,760)	(17,272,307)
5.00%	US$412,505	US$2,162	US$493	US$113,768	32,063,657	(1,230,282)	(18,502,589)
5.25%	US$412,505	US$2,221	US$493	US$116,308	30,818,224	(1,245,433)	(19,748,022)
5.50%	US$412,505	US$2,281	US$493	US$118,878	29,558,014	(1,260,210)	(21,008,232)
5.75%	US$412,505	US$2,342	US$493	US$121,477	28,283,406	(1,274,608)	(22,282,840)
6.00%	US$412,505	US$2,403	US$493	US$124,105	27,249,752	(1,033,654)	(23,316,494)
6.25%	US$412,505	US$2,465	US$493	US$126,760	26,394,326	(855,426)	(24,171,920)
6.50%	US$412,505	US$2,528	US$493	US$129,443	25,530,198	(864,128)	(25,036,048)
6.75%	US$412,505	US$2,591	US$493	US$132,152	24,657,622	(872,576)	(25,908,624)
7.00%	US$412,505	US$2,655	US$493	US$134,886	23,776,850	(880,772)	(26,789,396)
7.25%	US$412,505	US$2,719	US$493	US$137,645	22,888,135	(888,715)	(27,678,111)
7.50%	US$412,505	US$2,783	US$493	US$140,428	21,991,728	(896,407)	(28,574,518)
7.75%	US$412,505	US$2,849	US$493	US$143,243	21,087,877	(903,851)	(29,478,369)
8.00%	US$412,505	US$2,915	US$493	US$146,062	20,176,829	(911,048)	(30,389,417)
8.25%	US$412,505	US$2,982	US$493	US$148,912	19,505,842	(670,987)	(31,060,404)
8.50%	US$412,505	US$3,049	US$493	US$151,783	18,974,005	(531,837)	(31,592,241)
8.75%	US$412,505	US$3,116	US$493	US$154,674	18,438,444	(535,561)	(32,127,802)
9.00%	US$412,505	US$3,184	US$493	US$157,584	17,899,294	(539,150)	(32,666,952)
9.25%	US$412,505	US$3,253	US$493	US$160,513	17,356,685	(542,609)	(33,209,561)
9.50%	US$412,505	US$3,321	US$493	US$163,460	16,810,748	(545,937)	(33,755,498)

Housing affordability index



Source: Yardeni

> “Similarly, with mortgage rates more than two percentage points higher than a year ago, demand for refinances continues to plummet, with MBA’s refinance index also falling to a 22-year low.”
>
> **JOEL KAN**
> MBA’S ASSOCIATE VICE PRESIDENT OF ECONOMIC AND INDUSTRY FORECASTING

One result of the run-up in both mortgage rates and home prices has been a slowdown in the record pace of home sales and mortgage applications. Existing home sales retreated for the seventh consecutive month in August 2022, with month-over-month sales declining in two of the four US regions, while year-over-year sales declined across all four US regions.

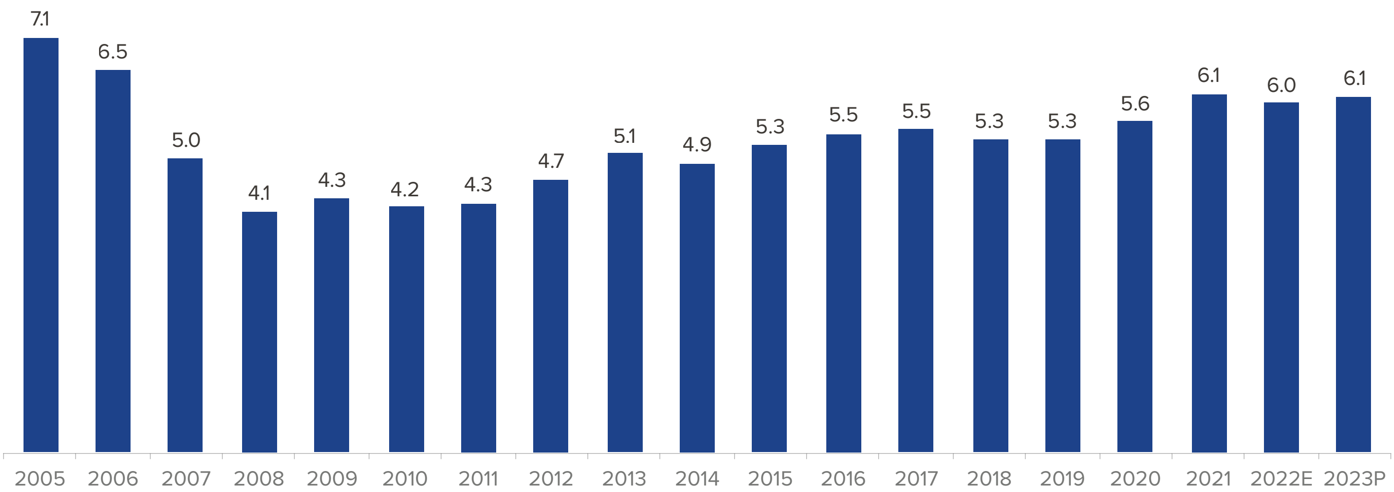
The 0.4% month-over-month decline in existing home sales in August is relatively insignificant in comparison to the 12.6% month-over-month decline experienced in July. As of the end of August, existing home sales registered a seasonally adjusted annual rate of 4.80 million — 19.9% below the August 2021 level of 5.99 million.

> “The housing sector is the most sensitive to and experiences the most immediate impacts from the Federal Reserve’s interest rate policy changes. The softness in home sales reflects this year’s escalating mortgage rates. Nonetheless, homeowners are doing well with near nonexistent distressed property sales and home prices still higher than a year ago.”
>
> **LAWRENCE YUN**
> NAR CHIEF ECONOMIST

Mortgage applications have also plummeted, with the slowdown impacting both the refinance and purchase loan markets. According to recent data from the Mortgage Bankers Association (MBA) Weekly Mortgage Application Survey (WMAS), the volume of mortgage applications continued its downward trajectory in the last week of September 2022, with purchase loan application volume falling 40% compared to the same period a year prior.

Further, the refinance market continued to retreat, with refinance loan application volume registering 84% lower than the same week a year prior. The effect has been particularly pronounced on first-time homebuyers — a July 2022 report from the MBA, which studied data through May, found an annual decline in the percentage of mortgage application volume on behalf of prospective first-time homebuyers from 32% to 27% in the year-over-year period.

US existing home sales over time (in millions)



Source: Statista

US mortgage applications over time (in millions)

Source: FHFA, National Mortgage Database (NMDB)

"The purchase market has suffered from persistently low housing inventory and the jump in mortgage rates over the past two months. These worsening affordability challenges have been particularly hard on prospective first-time buyers."

JOEL KAN

MBA'S ASSOCIATE VICE PRESIDENT OF ECONOMIC AND INDUSTRY FORECASTING

> "Further sales declines should be expected in the upcoming months given housing affordability challenges from the sharp rise in mortgage rates in 2022. Nonetheless, homes priced appropriately are selling quickly and inventory levels still need to rise substantially — almost doubling — to cool home price appreciation and provide more options for buyers."
>
> **LAWRENCE YUN**
> NAR CHIEF ECONOMIST

Limited supply, combined with rising prices, slowed the pace of existing home sales nationwide for eight consecutive months last year. Sales of previously owned homes fell nearly 2% in September month-over-month, settling at a seasonally adjusted annual rate of 4.71 million units, about 24% lower than September 2021 and the slowest pace of existing home sales since November 2015, aside from a brief plunge at the start of the COVID-19 pandemic in the spring of 2020. These factors have led many to rethink their homebuying and/or selling plans — homes are taking longer to sell, and demand is dwindling. Searches for "homes for sale" on Google during the week ended August 20 were down 16% from the same period a year earlier, but up 12% from a late May trough.

Further, the Redfin Homebuyers Demand Index, a measure of requests for home tours and other homebuying services from Redfin agents, was down 12% year-over-year during the week ended August 21 but had rebounded by 18% from a late June low.

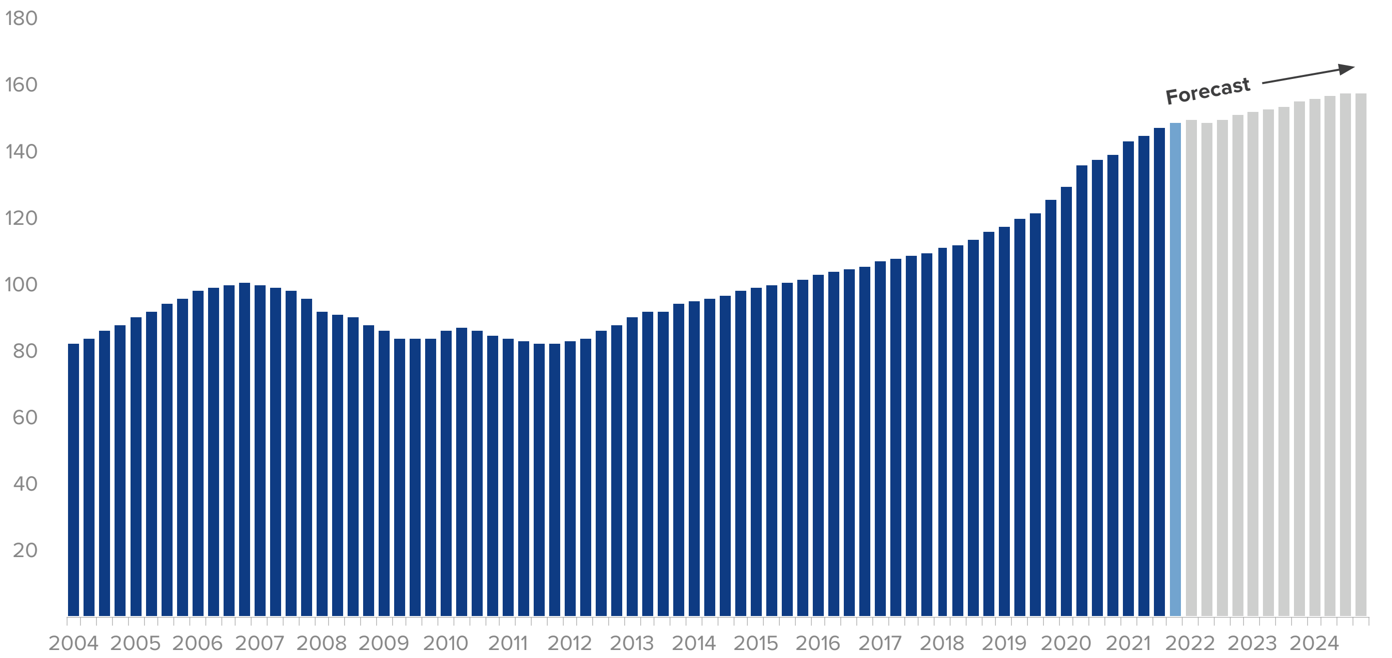
The result of slowing homebuying and on-the-market inventory has been many individuals opting to improve their existing space rather than find a new home — keeping the fire lit under an already red-hot residential remodeling market

RESIDENTIAL REMODELING ACTIVITY REMAINS HIGH AMID PURCHASE MARKET SLOWDOWNS

Coming off a strong 2021, the residential remodeling market remains among the strongest in recent history. Zonda's Residential Remodeling Index (RRI), a statistical model that considers data such as household level remodeling permits and consumer-reported remodeling and replacement projects nationwide, registered a record-high reading of 151.3 in the fourth quarter of 2021, representing a 9.7% gain from the fourth quarter a year prior. This RRI reading indicates that remodeling activity was 51% higher than the previous peak in 2007, and growth during the fourth quarter of 2021 marked the 39th consecutive quarter of growth since remodeling activity bottomed in 2011. The RRI increased 29.9% in 2021, the strongest annual increase in the index's history, which dates back to 2004. Zonda projected that 366 of 384 observed metropolitan statistical areas would see growth in annual project volume in 2022, with the average growth rate coming in at 4.1%.

Similarly, the Leading Indicator of Remodeling Activity (LIRA), designed to record historical spending nationally on home improvement and repair of owner-occupied homes, as well as project short-term outlook, has experienced strong growth. The LIRA indicates homeowners spent over US$1.5 billion on home improvements in the 12-month period through June 2022, roughly US$150 million, or 11%, more than the same period a year prior. Further, the LIRA forecasted remodeling spending would grow 17.3% and 17.4% in the third and fourth quarters of 2022, before tapering off to annual growth of ~10% this year.

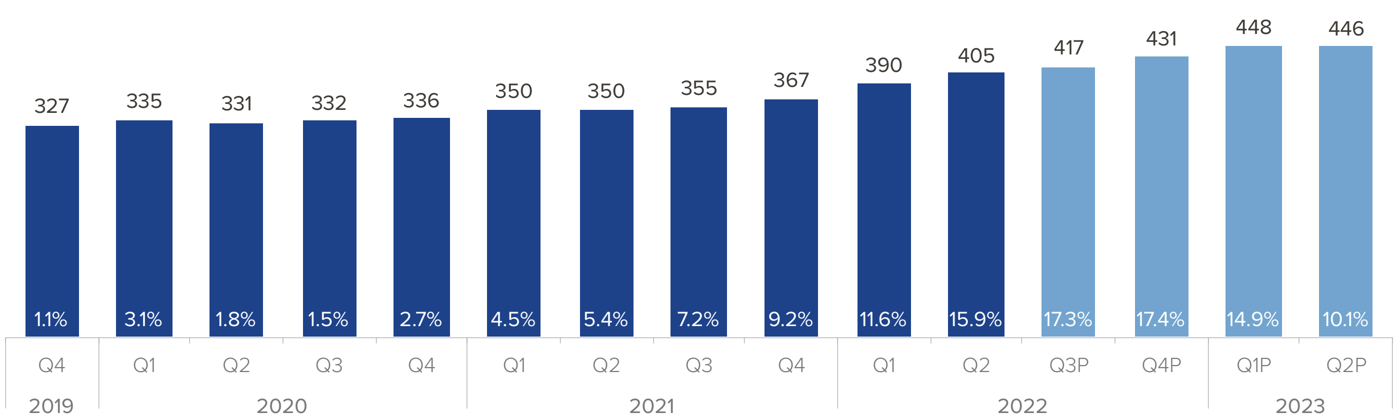
Zonda Residential Remodeling Index (USA)



Source: Zonda

> "Following a busy year for the home renovation and design industry… professionals were bullish that momentum would continue through 2022. The positive outlook is prevalent across industry groups, from architects and designers to builders and landscapers, despite headwinds in the form of reduced labor and product availability and price volatility."
>
> **MARINE SARGSYAN**
> HOUZZ SENIOR ECONOMIST

US homeowner improvement spending, quarterly LIRA (US$ in billions)



Source: JCHS

> "Accumulated home equity and other industry fundamentals continue to drive demand for improvements to aging housing stock and upgrades that will enable homeowners to stay in their homes long into retirement years."
>
> **MARINE SARGSYAN**
> HOUZZ SENIOR ECONOMIST

Houzz, a residential remodeling platform that provides insights into the current residential remodeling market via homeowner surveys and regularly published research reports, estimates that more than half of homeowners (55%) performed some level of home renovations in 2021, and an equal percentage (55%) had plans to perform some level of renovations in 2022. For the first time since 2018, homeowners, planned spend increased to US$15,000 for 2022, compared to US$10,000 for the previous three years. The share of homeowners relying on cash to fund renovation projects dropped from 83% in 2021 to 76% as of October 2022, driven by homeowners capitalizing on recent increases in homeowner equity, which equates to roughly US$100,000, on average, since the start of 2021. Overall, homeowners relied on professional assistance at a greater rate in 2022 (89%) as compared to 2021 (87%), with the difference more pronounced among recent homeowners (93%) compared to all other homeowners (88%).

Homeowners are benefiting from consumer-friendly homeowner financing options that continue to enter the market and gain traction. GreenSky, for example, which was acquired by Goldman Sachs in March 2022 for over US$2 billion, is currently the largest fintech platform for home improvement consumer loan originations. GreenSky, which offers homeowners low-interest, point-of-purchase loans of up to US$65,000 for home improvement projects, primarily appeals to homeowners via (i) fast funding — the company provides bank-funded loans direct through its partner home improvement contractors and retailers at the point-of-sale; and (ii) attractive pricing options and structures — including interest-free promotional periods, and rate reduction repayments. The emergence of fast, cost-competitive homeowner financing options has reduced the burden on homeowners to fund improvement projects and increased ease and accessibility. Strong spending on residential remodeling — reflected by the proportion of homeowners engaging in such activities, growing budgets and accessibility to financing — is likely to continue in the near-to-medium term, as current and prospective homeowners alike grapple with limited available-for-sale housing inventory, intense competition in the sale market, and climbing mortgage rates.

The lack of available-for-sale home supply and declining home purchase affordability has fueled demand for rental units. As home prices have risen, and availability has fallen, many prospective homeowners have put purchase aspirations on hold in favor of shorter-term rentals. Prospective homeowners flooding the rental market have pushed up rental prices, leaving landlords with the power to raise rent without fear of losing potential tenants.

> "Market fundamentals including limited and aging housing stock, continue to propel the home renovation market. Homeowners are clearly committed to investing in their homes despite heightening product and material costs driven by supply chain disruptions and are exploring diverse funding sources. This is especially pronounced among recent homebuyers, who rely heavily on cash from previous home sales to fund their projects and spend significantly more than the national median."
>
> **MARINE SARGSYAN**
> HOUZZ SENIOR ECONOMIST

For cash-strapped renters, the situation is growing more tumultuous in major metro areas. The Zumper National Rent Index shows the median rent for a newly listed one-bedroom was at US$1,504 as of October 2022, up ~10% from September 2021, and above the previous record high registered in August 2022.

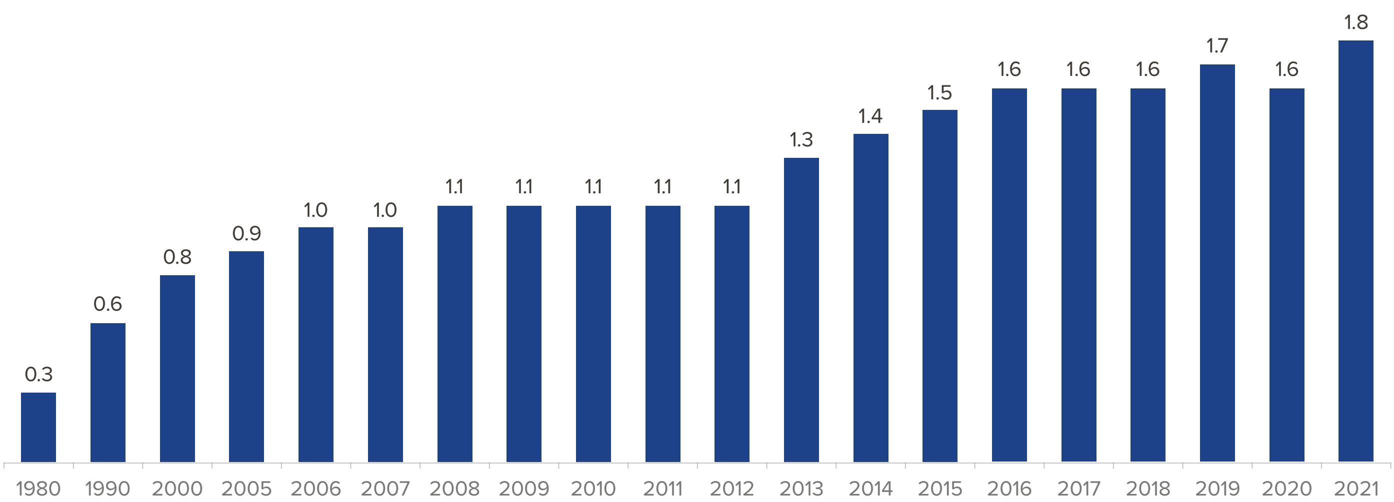
More than half of US cities are experiencing double-digit rent hikes, with some showing annual rental increases of over 30% — New York City remains the priciest place to be a tenant, with the median one-bedroom apartment rent up 39.9% from a year ago.

Top 20 most expensive US cities for apartment rentals (in US$)

		1 bedroom		2 bedrooms	
Ranking	City	Price	YoY increase	Price	YoY increase
1	New York, NY	3,930	39.9%	4,400	46.7%
2	San Francisco, CA	3,040	8.6%	4,200	9.7%
3	San Jose, CA	2,780	26.4%	3,280	20.6%
4	Boston, MA	2,730	18.7%	3,170	16.1%
5	San Diego, CA	2,580	29.0%	3,260	20.7%
6	Miami, FL	2,520	34.0%	3,410	37.5%
7	Los Angeles, CA	2,450	19.5%	3,290	17.5%
8	Washington, D.C.	2,370	9.7%	3,240	11.3%
9	Oakland, CA	2,200	10.0%	2,800	7.7%
10	Santa Ana, CA	2,160	18.0%	2,770	20.4%
11	Seattle, WA	2,000	21.2%	2,810	32.5%
11	Fort Lauderdale, FL	2,000	20.5%	2,970	25.8%
13	Anaheim, CA	1,950	10.8%	2,700	25.0%
14	Scottsdale, AZ	1,900	8.0%	2,460	7.0%
15	Chicago, IL	1,830	26.2%	2,120	22.5%
16	Tampa, FL	1,800	34.3%	2,040	28.3%
16	Providence, RI	1,800	20.0%	1,930	14.2%
16	Long Beach, CA	1,800	12.5%	2,400	11.6%
19	Nashville, TN	1,780	29.0%	1,900	26.7%
20	Atlanta, GA	1,770	6.6%	2,220	4.7%

Source: Zumper

Median price for a one-bedroom rental in the USA (US$ in thousands)



Source: Statista

Steep increases in rental rates, combined with pricing power for landlords, have pushed many investors into the multifamily market, which experienced strong activity in 2022. Dodge Construction Network estimates that the value of multifamily construction starts in the top 20 metro areas of the USA increased 24% in the first six months of 2022, relative to 2021. Further, Dodge's analysis of commercial and multifamily construction spending (predominantly multifamily, but also including office buildings, stores, hotels, warehouses and commercial garages) found it had risen 18% nationally through the end of June, relative to the same period a year prior, and 28% specifically within the nation's top 10 metro areas. The New York metropolitan area ranked as the top market for commercial and multifamily starts during the first half of 2022 at US$15.3 billion, representing a 20% increase from the first half of 2021. The entirety of New York's growth in 2022 was driven by multifamily starts, which were up a staggering 51% through June (commercial starts were down 22% through June), driven by the US$800 million Two Bridges mixed-use complex, the US$450 million Neptune/Sixth mixed-use building, and the US$425 million 250 Water Street apartments. Other major US metros seeing strong growth in multifamily spending through the first six months of 2022 include Washington D.C. (up 14%), Miami (up 51%), Austin (up 25%), Atlanta (up >100%), Seattle (up 25%) and Philadelphia (up 14%).

Top 20 US metropolitan areas for commercial & multifamily starts

#	City	2022 spending (US$ in thousands)
1	New York - Northern New Jersey - Long Island, NY-NJ-PA	15,328
2	Dallas - Fort Worth - Arlington, TX	8,121
3	Washington - Arlington - Alexandria, D.C.-VA-MD-WV	5,452
4	Miami - Fort Lauderdale - Miami Beach, FL	4,539
5	Austin - Round Rock, TX	4,304
6	Phoenix - Mesa - Scottsdale, AZ	4,176
7	Atlanta - Sandy Springs - Marrietta, GA	4,172
8	Seattle - Tacoma - Bellevue, WA	3,500
9	Los Angeles - Long Bong - Santa Ana, CA	3,421
10	Philadelphia - Camden - Wilmington, PA-NJ-DE-MD	3,220
11	Houston - Baytown - Sugar Land, TX	3,192
11	Boston - Cambridge - Quincy, MA-NH	3,190
13	Denver - Aurora, CO	2,819
14	Orlando, FL	2,552
15	Tampa - St. Petersburg - Clearwater, FL	2,472
16	Chicago - Naperville - Joliet, IL-IN-WI	2,427
16	San Jose - Sunnyvale - Santa Clara, CA	2,145
16	Nashville - Davidson - Murfreesboro, TN	1,883
19	Minneapolis - St. Paul - Bloomington, MN-WI	1,833
20	Kansas City, MO-KS	1,707
	Total	**80,453**
	Total USA	**139,521**

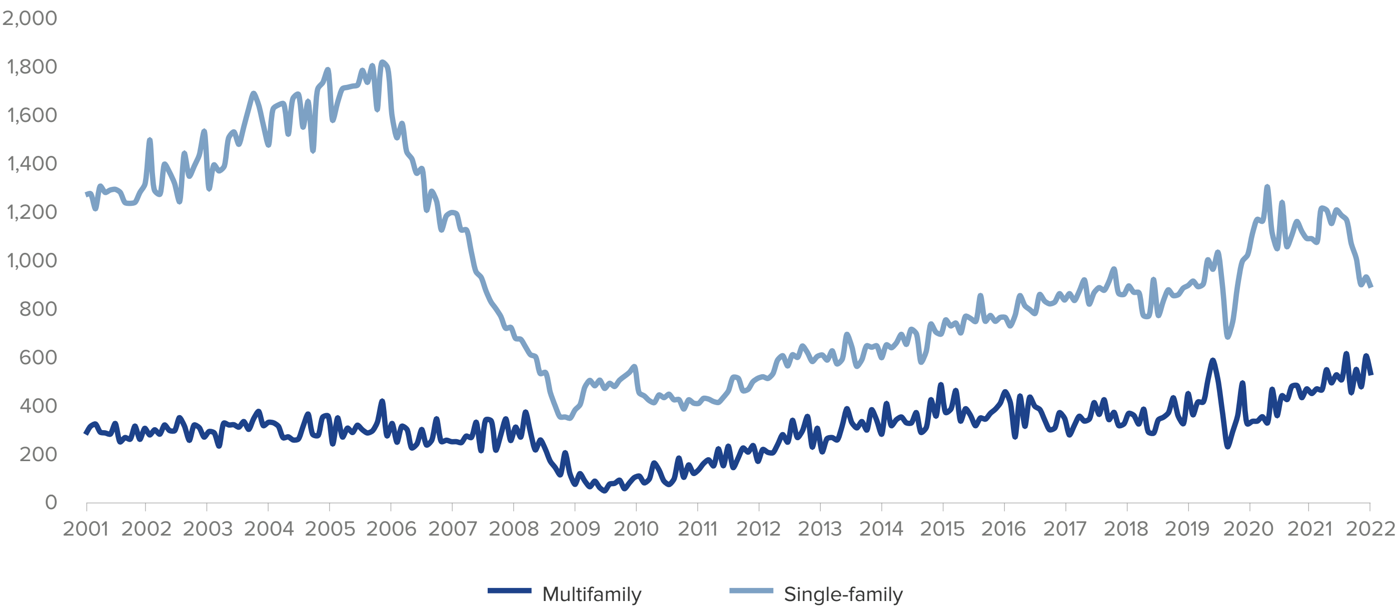
#	City	Spending growth 2019–2022
1	Phoenix - Mesa - Scottsdale, AZ	170%
2	San Jose - Sunnyvale - Santa Clara, CA	159%
3	Tampa - St. Petersburg - Clearwater, FL	114%
4	Dallas - Fort Worth - Arlington, TX	107%
5	Denver - Aurora, CO	104%
6	Seattle - Tacoma - Bellevue, WA	78%
7	Kansas City, MO-KS	60%
8	Austin - Round Rock, TX	54%
9	Orlando, FL	39%
10	Miami - Fort Lauderdale - Miami Beach, FL	31%
11	Atlanta - Sandy Springs - Marrietta, GA	18%
11	Philadelphia - Camden - Wilmington, PA-NJ-DE-MD	16%
13	Minneapolis - St. Paul - Bloomington, MN-WI	13%
14	New York - Northern New Jersey - Long Island, NY-NJ-PA	1%
15	Los Angeles - Long Bong - Santa Ana, CA	(11%)
16	Houston - Baytown - Sugar Land, TX	(18%)
16	Nashville - Davidson - Murfreesboro, TN	(24%)
16	Washington - Arlington - Alexandria, D.C.-VA-MD-WV	(24%)
19	Boston - Cambridge - Quincy, MA-NH	(26%)
20	Chicago - Naperville - Joliet, IL-IN-WI	(27%)
	Total	**18.0%**
	Total USA	**22.4%**

Source: Construction.com

Nationwide, multifamily starts activity was strong throughout 2022 and represents an area of the residential housing market that is showing strength amid slowdowns to single-family building and sales activity. Starts for multifamily housing projects with at least five units reached a seasonally adjusted annual rate of 530,000 in September 2022 — up 17% from a year earlier. The current situation is similar to the post-Great Recession period, when homeownership affordability challenges pushed prospective homeowners into rental markets, resulting in a more feverish ramp in multifamily starts relative to single-family starts. While single-family starts are yet to eclipse levels seen prior to the collapse of the housing bubble and subsequent Great Recession, multifamily starts volume currently sits between 1.5x to 2.0x of early-to-mid 2000s levels.

> "Rising rents are creating an incentive to build more rental units, even in the face of rising financing costs."
>
> **ANETA MARKOWSKA AND THOMAS SIMONS**
> JEFFERIES ECONOMISTS

Historical US single-family & multifamily starts (in thousands)



Source: FRED

Commercial market trends

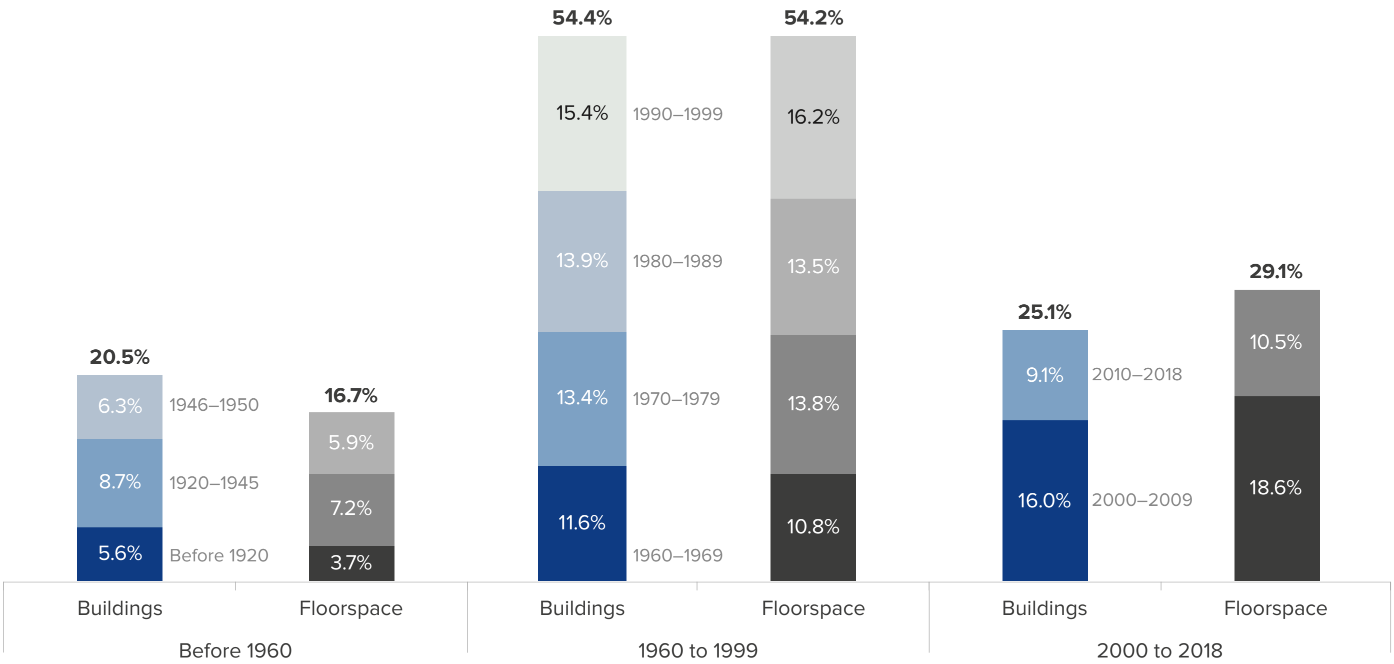
Oaklins

Shifting space demands mean a rise in renovation, retrofit and remodeling

LARGE-SCALE, AGED COMMERCIAL SPACES ARE PRIME CANDIDATES FOR RENOVATION/ REMODELING

Despite disruption in the nonresidential sector, there is a strong case for continued investment across a wide range of commercial property types. Demand for commercial/industrial property is evolving, necessitating property owners to reimagine properties fading from relevancy and transform them functionally and aesthetically to meet the demands of the modern market. Among the prime candidates for such repurposing are facilities that have largely fallen out of favor — malls, antiquated office buildings and large-scale commercial campuses. Demand to renovate these spaces is particularly driven by one defining characteristic: US commercial building stock is heavily comprised of aged infrastructure that lacks modern features, and outdated spaces not commensurate with current economic demands. Such old infrastructure will drive significant future activity to both retrofit/ repurpose existing, spaces and erect additional commercial supply to address the most severe supply-demand imbalances in the commercial real estate market.

US commercial buildings by year constructed



Source: US Energy Information Administration

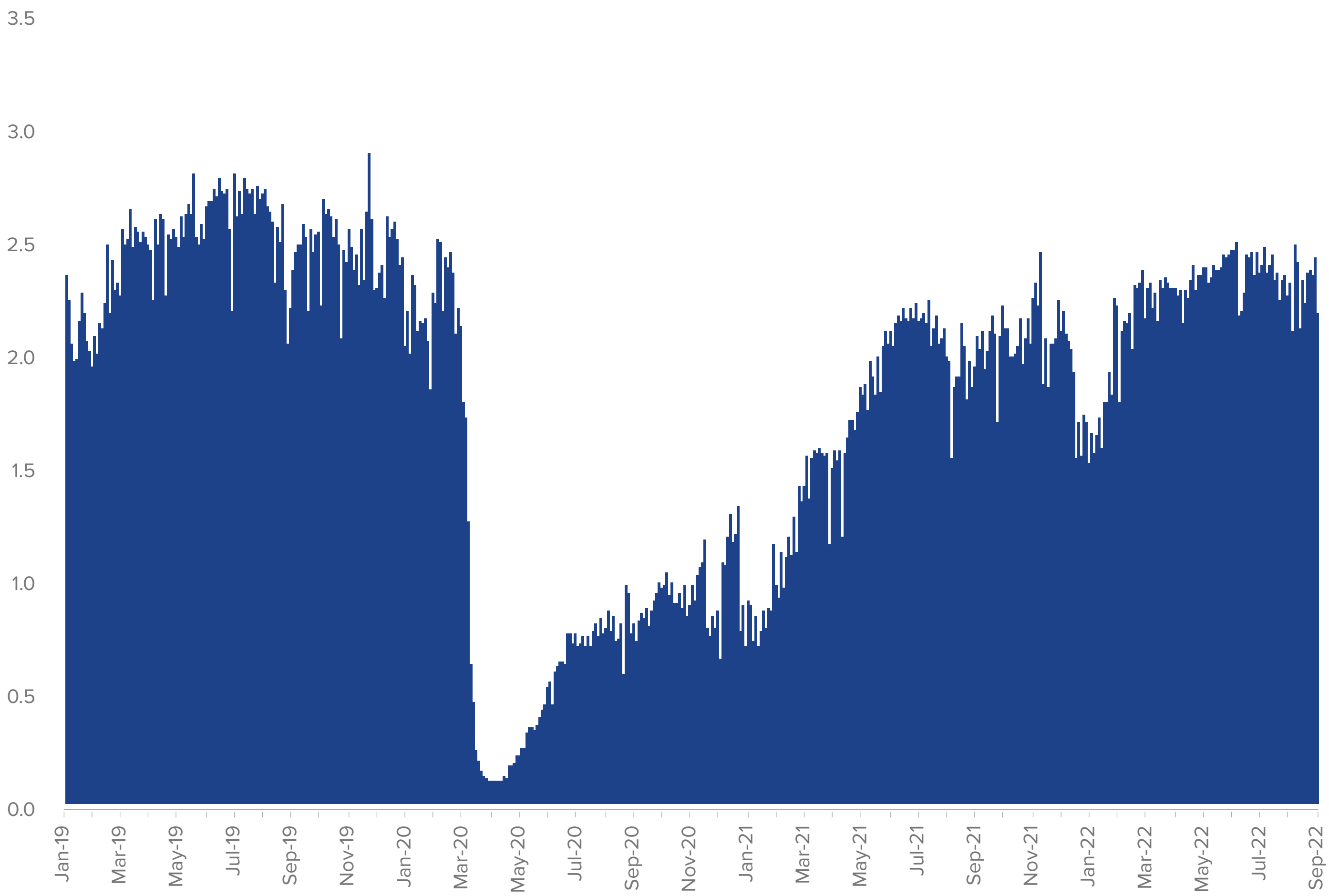
HOSPITALITY/LODGING: Since the depths of the COVID-19 pandemic, which saw demand for hospitality and lodging crater, the narrative around economic activity in this sector has flipped. Currently, hotel owners around the world are all sending the same message: there are unprecedented levels of demand, and therefore pricing power, in the market today. Such claims by ownership and management are substantiated by travel-related metrics. Daily TSA checkpoint travel volume has fully recovered to typical pre-pandemic daily volumes. Additionally, a 2021 report studying the impacts of the COVID-19 pandemic on vehicular traffic found that traffic volume bottomed by April 2020 but had recovered to within 3% of typical pre-pandemic levels as early as March 2021. The Tourism Economics Travel forecasting model — another popular gauge of travel spending across consumer groups — found that domestic leisure travel has already surpassed pre-pandemic levels, even when adjusted for inflation. The model also demonstrates that domestic business travel is finally picking up, with volume expected to have reached 81% of pre-pandemic levels in 2022, and 96% this year. The revival of travel volume has generated a backlog of demand for the hospitality and leisure segment, which put virtually all renovation- and remodeling-related spending on hold at the onset of the COVID-19 pandemic to conserve cash. As it becomes clear we've now fully emerged from a COVID-characterized environment, hotels will likely begin to deploy these excess "reno/remodeling reserves", which play a large role in the marketability of the asset.

> "Demand for travel is off the charts right now. I compare what is happening in the travel industry to the video game Mario Kart, when you'd drive over the arrows on the track and get a little boost. When you take something away from humans for two years, like travel, you just turbocharge the demand."
>
> **MATTHEW UPCHURCH**
> CEO OF VIRTUOSO

Hotel renovations, despite high price tags, are often worth the financial investment, as the aesthetic and feel of the hotel directly impact its marketability and functionality, and therefore heavily influence the site's profitability. To quantify the financial impact of renovation on a sample hotel, Hotel & Leisure Advisors studied an example hotel over a six-year period that included the three years prior to renovation, the year in which renovation occurred, and two years after the renovation was completed. The hotel, located geographically in an urban area and affiliated with a national franchise, was suffering from declining occupancy levels in each of the three years prior to renovation — the hotel reached its lowest RevPAR (Revenue Per Available Room, a popular measure of economic efficiency in the hospitality sector) just prior to the renovations.

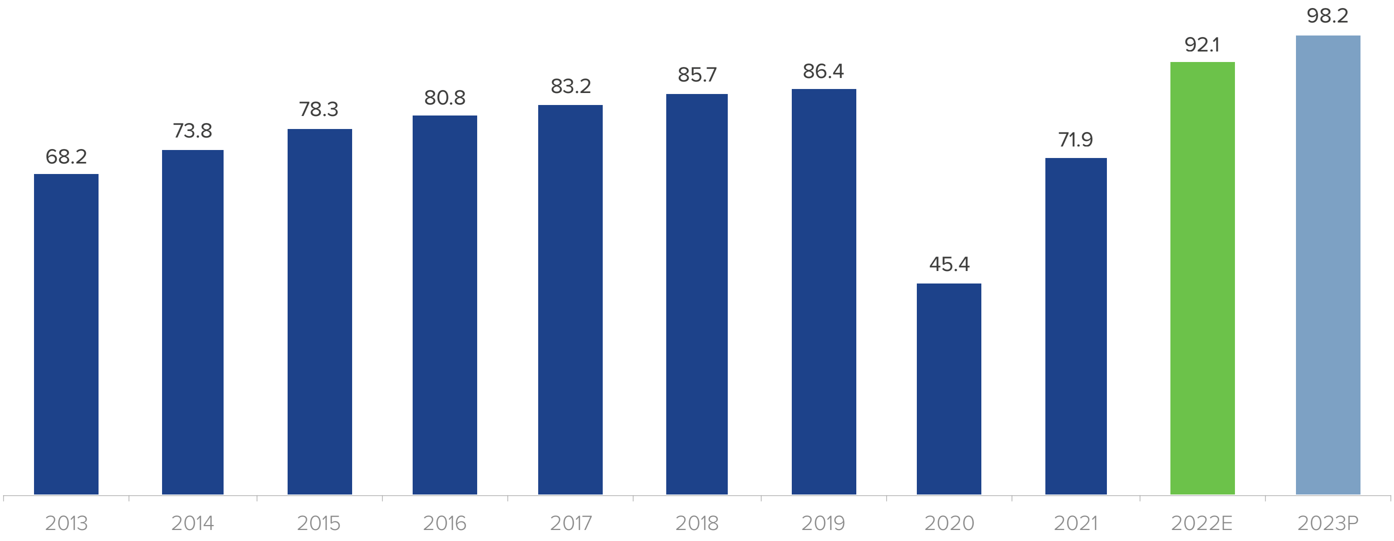
Following the renovations, the hotel's net operating income as a percentage of total revenue improved by ~15% between the year in which the renovations took place and two years post-renovation — in addition to improved rental rates for guest rooms, the hotel transformed the non-revenue generating portion of its lobby into a full-service bar, which carries with it a high profit margin (while not part of this project, another popular renovation for hotels of late has been rooftop bars, which is an additional way to monetize often-underutilized parts of the property). Based on Hotel & Leisure's calculations, the property recorded an annual net operating income (NOI) approximately 33% greater in the post-renovation period compared to the 12 months prior to the completion of the renovation — most of the NOI rise was driven by increases to gross revenues.

Daily TSA checkpoint passenger volume in the USA (in millions of travelers)



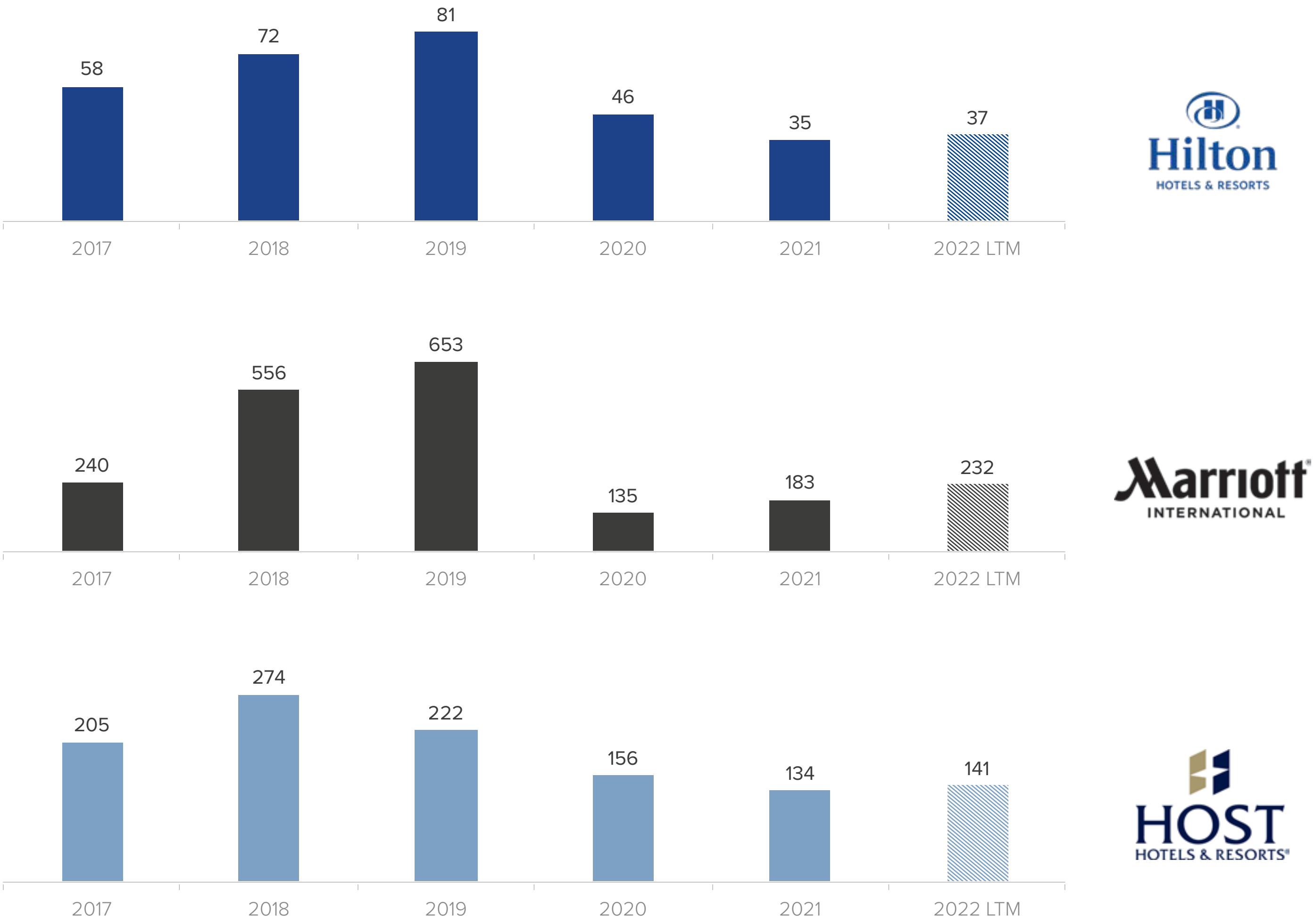
Source: TSA

US hospitality RevPAR (in US$)



Source: PWC

Hotel renovation & remodeling spend (US$ in millions)



Source: CapitalIQ. 2022 data up to June

MALLS: Once an epicenter of suburban lifestyle, the concept of the mall is fading — although this trend was underway long before the COVID-19 pandemic, that crisis helped catalyze the bankruptcy of numerous specialty retail outlets, while anchor department store bankruptcies destabilized the dependability of shopping centers and shopping malls. With the relevancy and demand for shopping malls fading, property owners and developers alike have repurposed the spaces in creative ways, which hint at a wave of commercial remodeling on the horizon. Amid the heights of the COVID-19 vaccination campaign, many malls were turned into makeshift vaccination centers — examples include the Sears at Livingstone Mall in Livingston, New Jersey and University Mall in Tampa, Florida. Not only have malls been used for large-scale vaccination endeavors, but some have been temporarily repurposed for healthcare services as well.

Among the most popular executed (or simply rumored) transitions of mall space are those that have reimagined them as modern office space. Malls have what offices require — square footage and a blank canvas of parking. Additionally, as portions of malls are converted into offices or co-working spaces, this could drive foot traffic to other businesses within the building including restaurants, gyms, etc., akin to urban commercial districts. Google led this wave of transition with its 2019 announcement that it agreed to lease the Westside Pavilion shopping center in Los Angeles for its office campus, dubbed One Westside. The mall is expected to be fully converted by sometime during the second quarter of this year, and connects to the Los Angeles Metro's Expo Line, which provides a light rail service between the city's downtown and neighboring suburban areas.

> "The 'fall of the mall' and 'retail apocalypse' have been buzz phrases littering business and consumer news sites for years now, but the pandemic seems to be the final nail in the coffin for the traditional mall... The only solution for REITs is to get creative in repurposing the space."
>
> **BRETT ROSE**
> CEO OF UNITED NATIONAL CONSUMER SUPPLIERS

Arguably, the most popular transition of mall space has been into warehouse space for fulfillment and/or distribution operations. The mall-turned-warehouse space phenomenon is one that originated prior to the COVID-19 pandemic — Amazon began buying up failed malls in the mid-2010s and transformed 25 such properties into fulfillment centers between 2016 and 2019. Converting mall space into warehouse space is logical for a variety of reasons; for one, it's spacious — and e-commerce requires three times the logistics space of traditional storefronts.

Further, businesses with e-commerce fulfillment have become hyperobsessed with customer service (i.e. speed-to-delivery) and thus have come to demand fulfillment/distribution centers that are centrally located in dense population hubs, with access to key transportation corridors — the exact template of the dying suburban mall.

> "Before the Great Recession we had too many retail spaces; now we have way too many retail spaces."
>
> **RANDY WHITE**
> CEO OF WHITE HUTCHINSON LEISURE & LEARNING GROUP

OLD OFFICE BUILDINGS: Old office buildings have emerged as prime candidates to alleviate the housing shortage plaguing the nation through transition to multifamily housing — a trend that has picked up over the last decade and become particularly hot coming out of the COVID-19 pandemic, as office vacancy rates, particularly for antiquated buildings, remain high amid major employer plans to reduce their physical footprints leading real estate developers to look at transforming vacant office spaces. Roughly 41% of converted apartments built since the start of 2020, or 13,250 units, have come out of ex-offices, and roughly one-quarter of the apartment conversions planned for 2022 and beyond will take place in former office buildings.

The concept is one that has begun to gain considerable traction in the most densely populated urban areas suffering from housing shortages, particularly New York City. Worried that the pandemic has made too many Manhattan office buildings obsolete, Mayor Eric Adams and Governor Kathy Hochul have joined an effort to ease conversions to residential use south of 60th Street. A recent study found that 10% of midtown Manhattan's older, less-than-prime office space could be converted to residential use, which would generate 14,000 new apartments — the study flagged Midtown East, the Garment District and Flatiron as three areas that could be targeted, due to their concentration of older buildings and extensive transit options.

Meanwhile, adaptive reuse, or repurposing an existing building for something new, can minimize the environmental impacts of construction, cost less money, take less time and create more housing in some of the most expensive cities across the USA

Top US metro areas for office-to-apartment conversions 2020–2021

City, State	# of conversions
Washington, D.C.	1,091
Chicago, IL	1,020
Alexandria, VA	955
Los Angeles, CA	904
Cleveland, OH	652
Philadelphia, PA	591
Honolulu, HI	571
Nashville, TN	458
Union, NJ	415
Hyattsville, MD	338

Source: CNBC

"This project is a great example of evolution in the shopping center industry. Today, people prefer to live in smaller spaces and want walkable developments rather than relying on vehicular transit. This project caters to those needs."

SPOKESPERSON
BROOKFIELD PROPERTIES

COMMERCIAL CAMPUSES: An additional, but more niche opportunity for commercial reuse includes various forms of commercial campuses that no longer serve their optimal use. In Chicago, Allstate, upon announcing that 95% of its employees were working from home, agreed to sell its Northbrook campus to Dermody Properties, which has hopes to transform the complex into warehouse space. Attracted to the site due to its proximity to Chicago's suburbs and transportation corridors, the development is likely to attract e-commerce businesses eager to deliver merchandise quickly to customers in the densely populated metro area. In Seattle, the Alderwood Mall in Lynnwood, a suburb north of the city, underwent an adaptive reuse project that transformed the shopping center into the "village square" concept that the complex had initially been envisioned to become — developers transformed the 40+ year-old shopping center into Avalon Alderwood Place, a 300-unit apartment complex with underground parking. The project did not completely erase the retail exposure of the complex, as commercial tenants still occupy nearly 90,000 square feet of retail space. In Denver, efforts are underway to transform the Cinderella City Mall into a transit-oriented development that includes housing, a civic center, City Hall offices, a library and an outdoor arts museum. Analogous examples exist across the country, with many more to come, as property owners and developers become forced to creatively reimagine and repurpose their spaces to be attractive in the rapidly shifting modern economy.

> "There have been some great examples of this kind of redevelopment, such as Tysons Corner in Virginia. If it's a good location, you can backfill that with residential, hotel, office and entertainment."
>
> **NICK EGELANIAN**
> PRESIDENT OF RETAIL CONSULTANCY SITEWORKS

> “The supply-and-demand imbalance is more significant than I have ever seen. There is limited inventory of industrial space. It is almost evaporating before your eyes, if you are even lucky enough to know about it.”
>
> **ROBERT THORNBURGH**
> CHIEF EXECUTIVE OF THE SOCIETY OF INDUSTRIAL AND OFFICE REALTORS

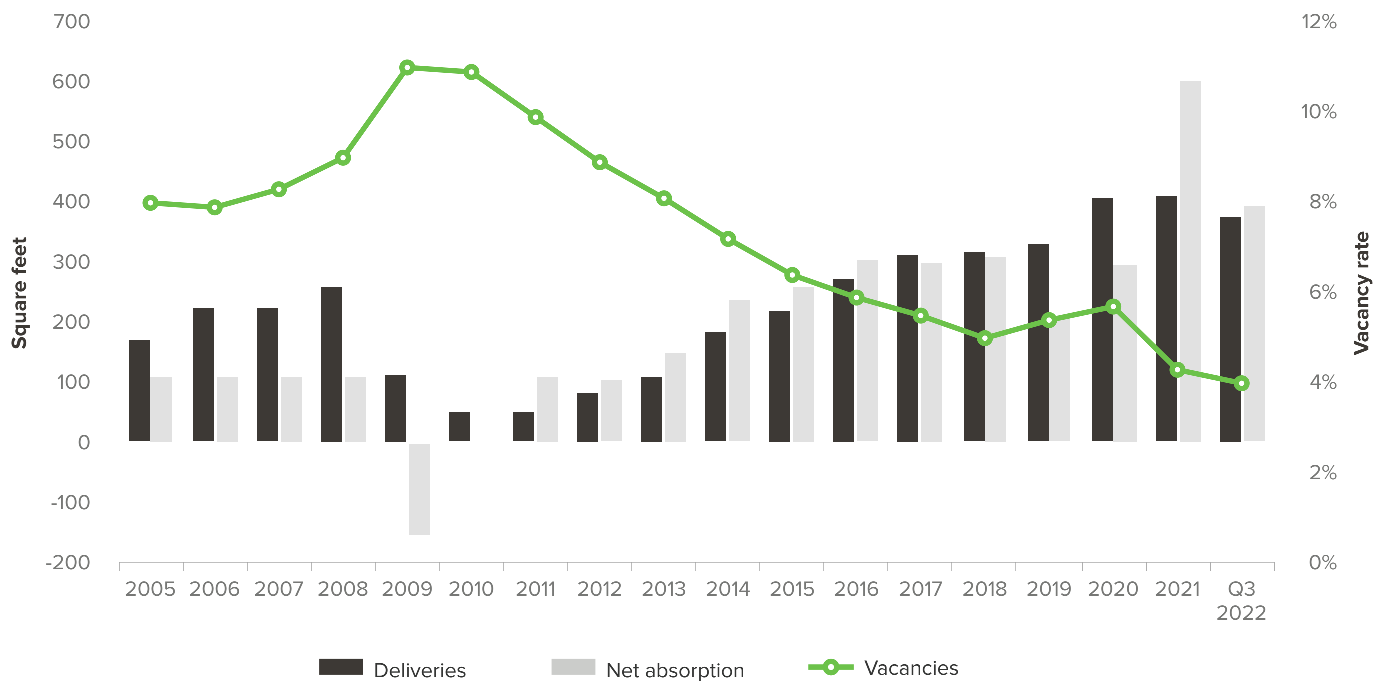
EVOLVING ECONOMIC LANDSCAPE SHIFTING DEMANDS FOR SPACE TYPES

Changes to the modern economy, combined with the economic shock of the COVID-19 pandemic, have permanently altered the mix of commercial space demanded by the market. The typical “core” asset classes — particularly retail and office — have seen demand plummet, and space configurations require a complete design overhaul. Simultaneously, multifamily space has come into short supply, particularly in densely populated metropolitan areas, while commercial/industrial spaces including warehouses, cold storage facilities, data centers and life science facilities have seen demand skyrocket, with no slowdown in sight given tightening supply-demand dynamics for these building types.

WAREHOUSE: Demand for warehouse space was on the rise prior to the pandemic, as American consumerism had begun its seismic shift to the virtual realm — the COVID-19 pandemic catalyzed an acceleration of an already ongoing trend, driving up demand for warehouse space to never-before-seen levels. According to research commissioned at the end of 2021, warehouse availability in the USA had fallen to record lows in the third quarter of 2021, with warehouse space being rapidly evaporated in the country’s busiest distribution hubs. Third-quarter demand for industrial real estate exceeded supply by some 41 million square feet, pushing the national vacancy rate down to 3.6%, the lowest level since 2002. All-time low vacancy rates have spurred record highs in both warehouse rental rates and warehouse development — as of the first quarter of 2022, there was a record pipeline of warehouses and industrial facilities under development in the USA, all of which is expected to be quickly absorbed by the market.

> “Companies are grabbing warehouses with 50% more space than they need. They are lowering operating margins just to increase infrastructure, so they have it.”
>
> **GREG SANGUINETTI**
> RO GROUP LOGISTICS IN SPARKS, NEVADA

US industrial real estate deliveries, absorption & vacancy (sq. feet in millions)

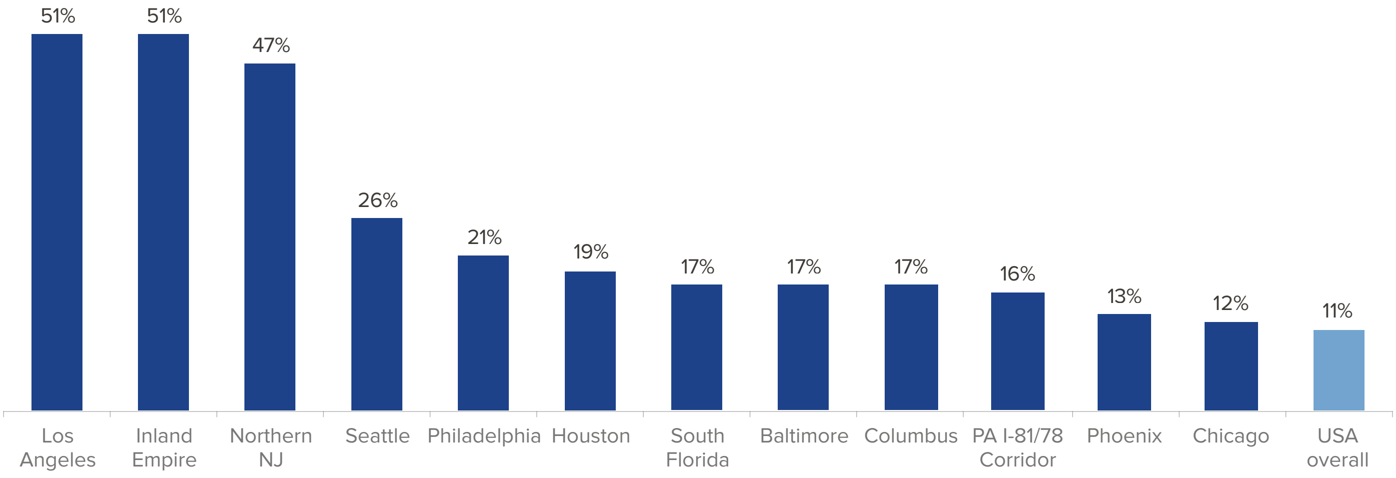


Source: Savills Research

"With vacancy rates as low as 1.6% in Southern California and top markets experiencing double-digit rental growth, the industrial market continues to be challenging for tenants. National construction activity is up 48% from one year ago, which should help ease conditions going forward, with current pipelines as high as 73 million square feet in Dallas-Fort Worth."

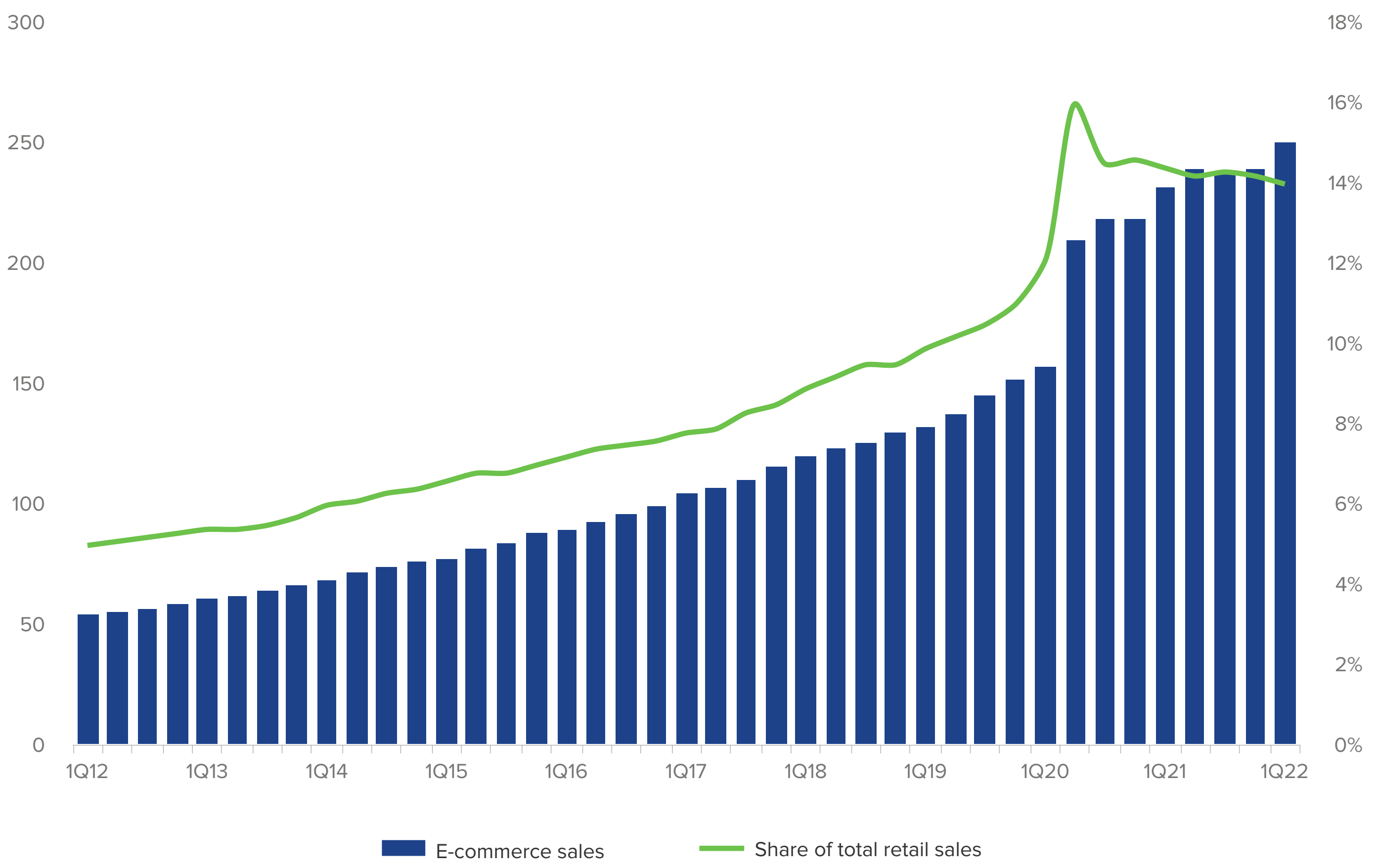
SAVILLS RESEARCH

Year-over-year growth in industrial rental rates in top US metro areas



Source: Savills Research

US e-commerce sales & penetration (US$ in billions)



Source: Savills Research

> "Consumers are eating healthier and buying fresher food, opting for the convenience of buying it online... you have a cluster of trends driving demand for cold storage."
>
> **WICK UDY**
> SENIOR VICE PRESIDENT OF JLL RESEARCH

COLD STORAGE: Demand for cold storage space, already on the rise prior to the pandemic, has similarly experienced a shift of the demand curve, as American consumers turn increasingly online for their everyday purchases — e-commerce grocery sales surged to US$98 billion via pickup, delivery and ship-to-home channels in 2021, with online penetration of grocery sales rising all the way to 13%, up from less than 10% prior to the pandemic. Online grocery shopping has evolved from basic convenience in the early days of the pandemic to a normal aspect of many consumers' shopping routines — according to a recent McKinsey & Company survey, grocery executives expect their companies' e-commerce penetration to more than double in the next three to five years to an average of 23%, but could be as high as 35%. The result of such shifts in consumer behavior has been increased demand for cold storage space, and thus increased investment and capital allocation to erect additional supply in the marketplace.

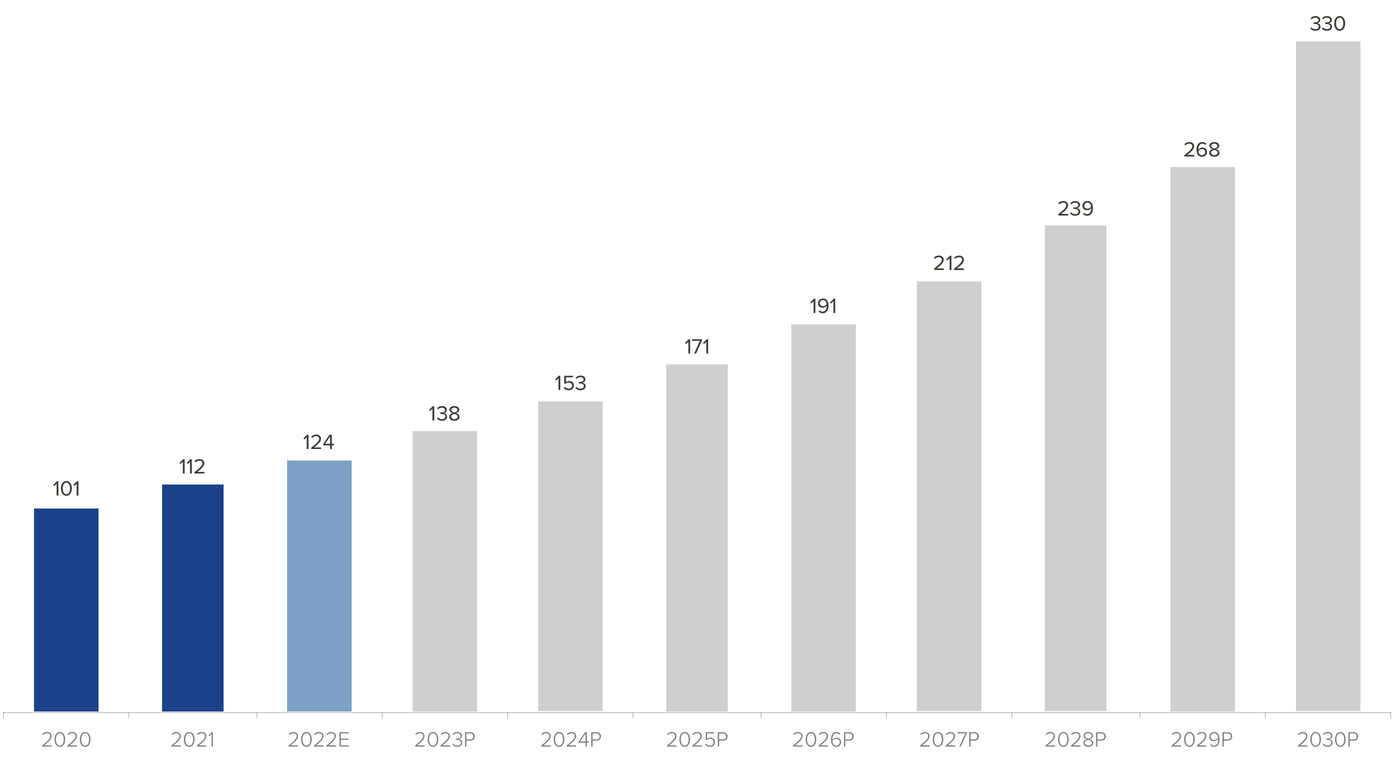
Overall demand for cold storage space is far outpacing supply and is expected to continue to do so for the next three to five years — the overall industrial real estate vacancy rate hovered around 3% for much of 2022, and it is believed the rate was lower for cold storage facilities. Cold storage leasing and sales activity rose by an average of 43% annually from 2017 to 2021, leading to an uptick in capital allocations from investors for new development — as of the end of the second quarter of 2022, there was 3.3 million square feet of speculative development underway in the USA, up from just 300,000 square feet in 2019. According to CBRE's 2022 US Investors Intentions Survey, nearly 40% of domestic real estate investors were pursuing cold storage assets in 2022, up from 22% in 2021 and 7% in 2019.

> "While there is tremendous demand, there is virtually no available freezer space in the Northeast US."
>
> **NEIL JOHNSON**
> PROVENDER CEO & FOUNDER

US cold storage investment volume (US$ in billions)

Source: CBRE Research

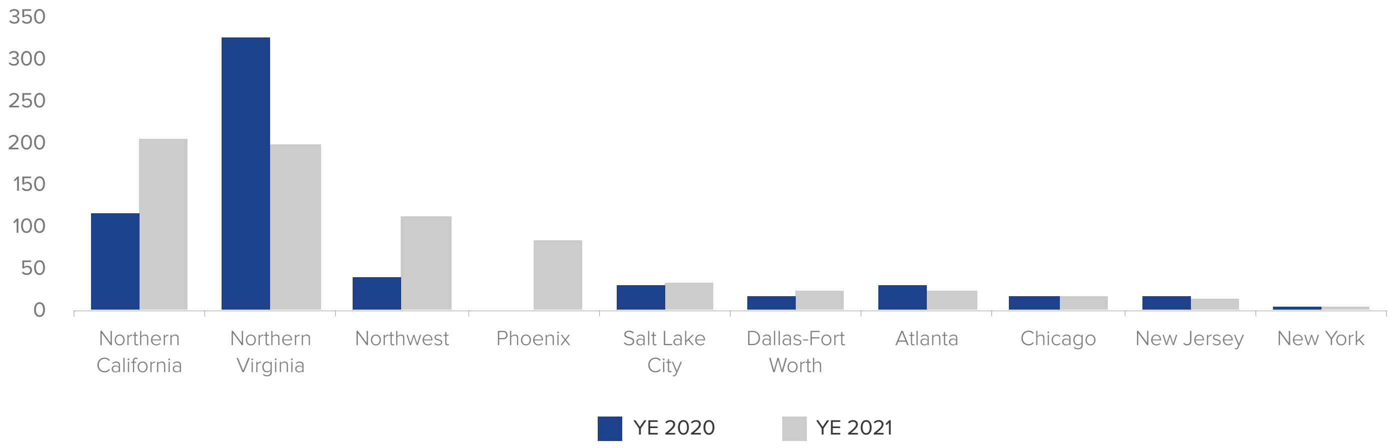
Global cold storage market size (US$ in billions)



Source: Precedence Research

DATA CENTERS: After a banner year in 2020 for data center demand, 2021 set new records at even higher levels. The US data center market saw 885.7 MW absorbed across 14 domestic markets — a 44.3% year-over-year increase from 2020, which itself set a record of 614 MW of absorption. Absorption was highest in Northern Virginia, underpinned by nearby federal government operations and newly constructed Amazon operations, and was more than twice as high as runner-up Phoenix. Data center construction also reached new highs globally, as well as in the USA, where domestic construction grew by 18.9% year-over-year to reach 727 MW.

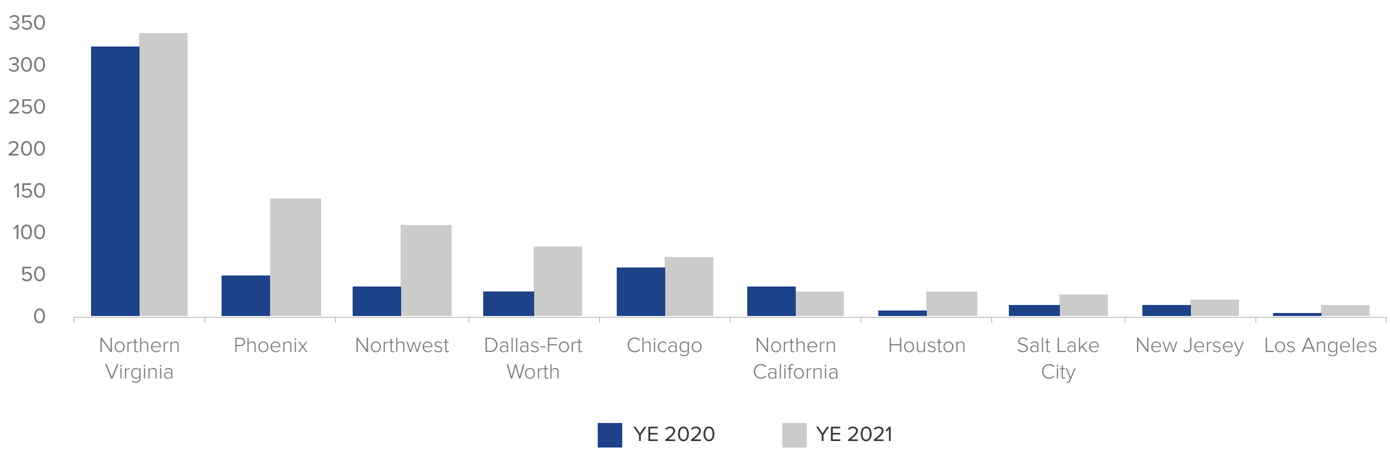
Data center space under construction by US market (in megawatts)



Source: JLL Research

> "The reliance on technology platforms over the last 24 months is at an all-time high, creating demand for more data center space across the world."
>
> **CARL BEARDSLEY**
> SENIOR DIRECTOR AT JLL CAPITAL MARKETS

Data center space absorbed by US market (in megawatts)



Source: JLL Research

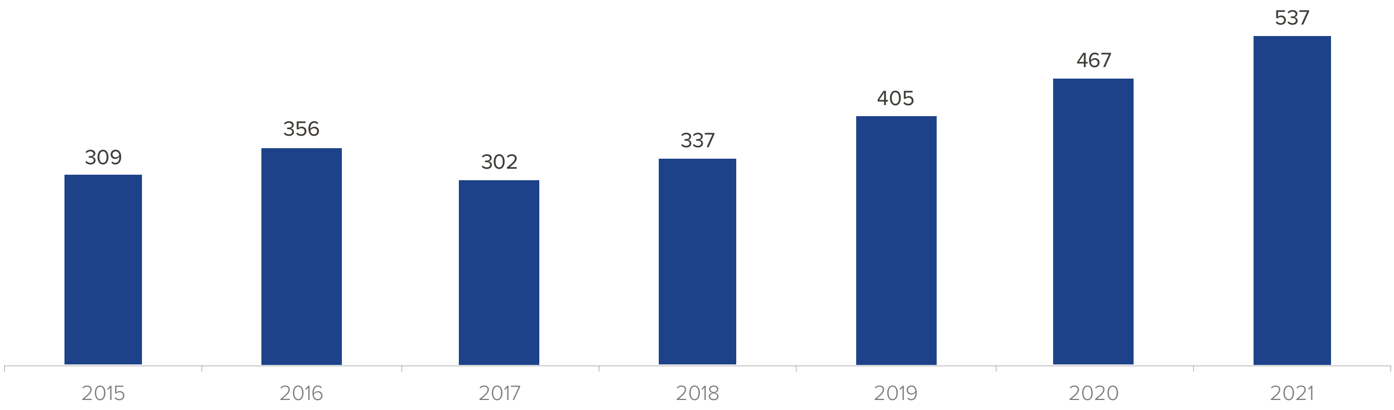
MEDICAL (LIFE SCIENCES): Life sciences remains one of the top-performing niche sectors in commercial real estate, as both tenant and investor demand for laboratory, incubator and biomanufacturing (GMP) space have accelerated during and following the COVID-19 pandemic. Investment in US life sciences real estate, comprised of lab and research & development (R&D) properties, reached US$21.4 billion in 2021, a 62% increase over 2020 — the sector has grown, in aggregate, 111% since 2018. Strong job gains in the ranks of biotechnology researchers and lab workers in US life sciences often coincide with increased demand for life sciences real estate — recent data shows a brisk pace of hiring in the life sciences sector, with sector headcount increasing 5.3% as of January 2022 relative to a year prior, outpacing the overall national job growth of 4.7% over the same time.

Not only does job growth affect the demand for overall space, which is running low — nationwide, the vacancy rate for life science facility space reached an all-time low of 4.9% in early 2022 — this has put strong upward pressure on prices as well. Average asking lease prices jumped 7.5% between March and September 2021 in the top 12 markets for life sciences real estate. Hiring, and thus the demand for increased space, is expected to continue given the record levels of capital allocation the market is experiencing — life sciences and healthcare venture capital funding reached a record US$43.3 billion in 2021, a 30% increase over 2020, which itself saw a record high. Venture capital funding for life sciences investment is expected to have risen once again in 2022, however, the compound annual growth rate of 21.3% over the past decade is likely to come down as the industry moves closer to maturity.

> "The surge in investment in the US life sciences market is underpinned by strong supply and demand fundamentals. A shortage of existing life sciences space available for purchase, coupled with robust and soaring property prices, have led most real estate investors focused on this sector to pursue development opportunities."
>
> **CHRIS BODNAR**
>
> VICE CHAIRMAN AND CO-HEAD OF HEALTHCARE & LIFE SCIENCES CAPITAL MARKETS AT CBRE

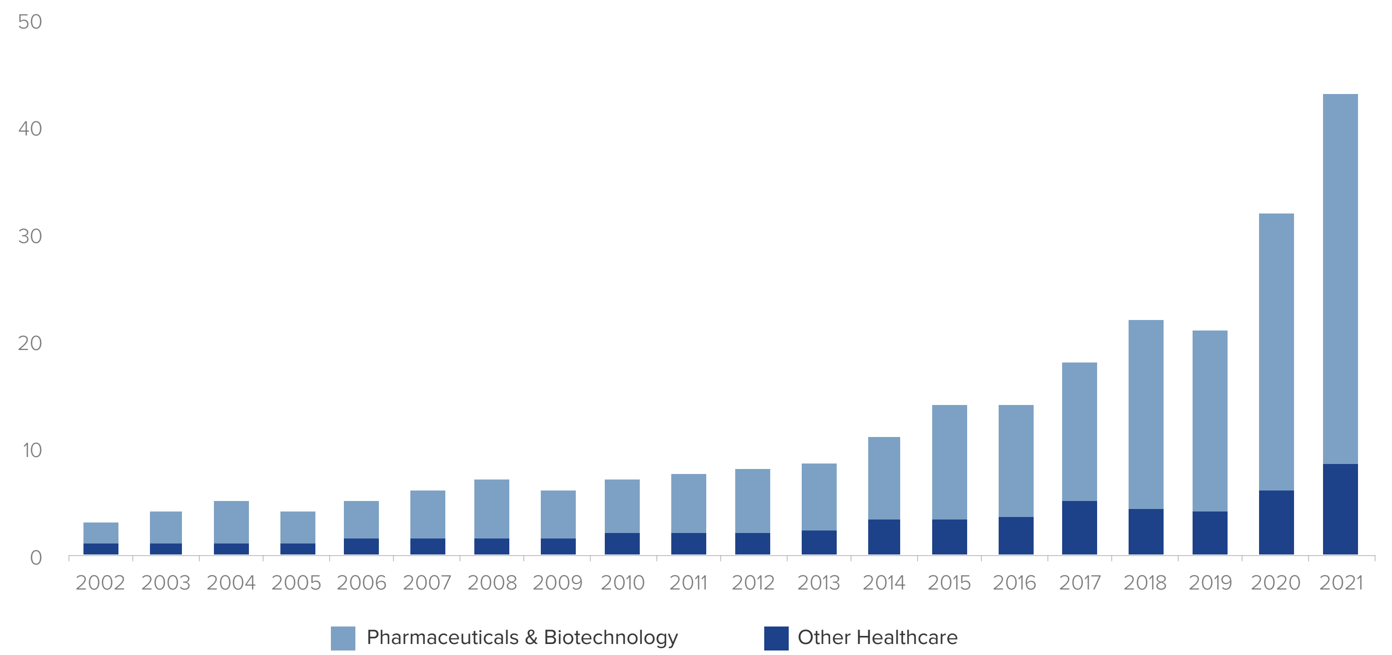
> "Real estate often lags other economic and business measures. In the case of the life sciences sector, demand for lab space is the natural result of robust growth in jobs and in public and private funding in recent years, despite recently challenging equity markets."
>
> **MATT GARDNER**
> CBRE US LIFE SCIENCES LEADER

US R&D & life sciences rental pricing (US$ per sq. foot)



Source: Newmark Life Science

US life sciences venture capital funding (US$ in billions)



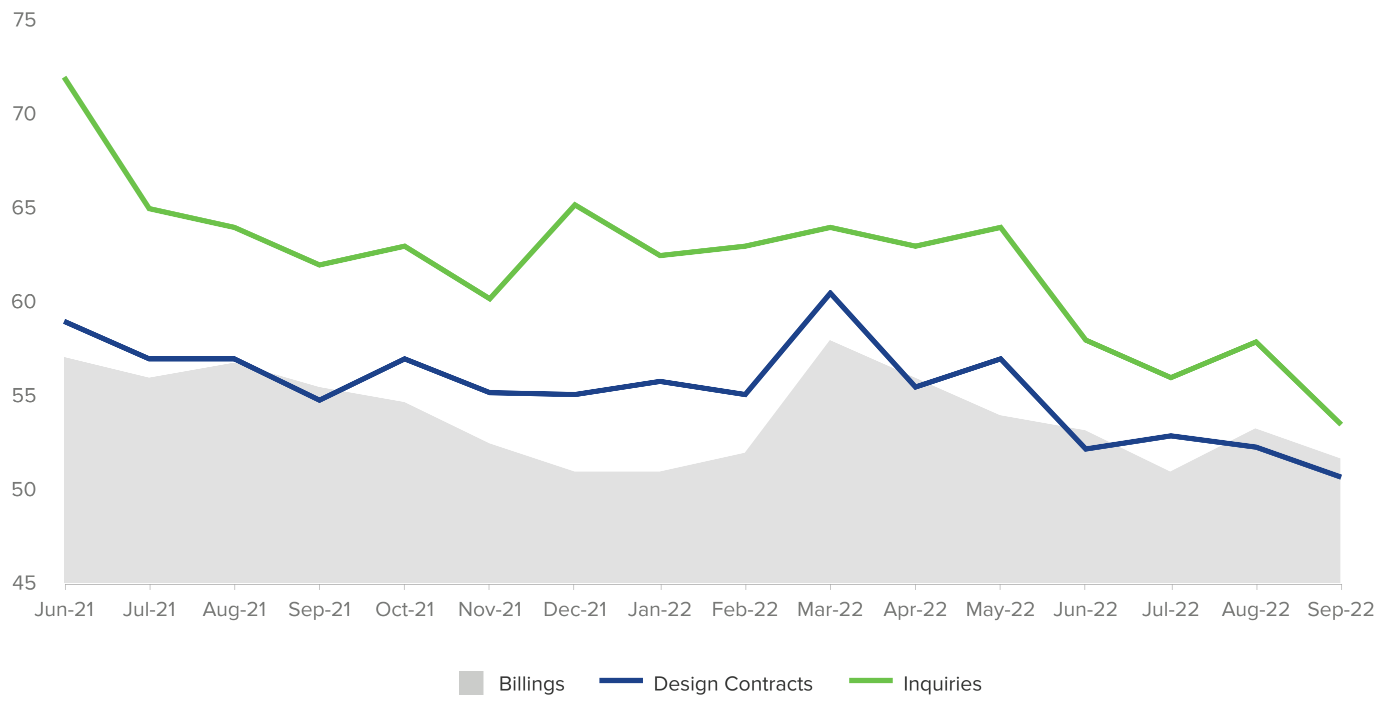
Source: Newmark Life Science

ARCHITECTURAL BILLINGS CONTINUE TO GROW, BUT WARNING SIGNS AHEAD

The demand for renovation/remodeling work across commercial and institutional asset classes has kept architectural firms busy since early 2021. The Architecture Billings Index (ABI), published monthly by the American Institute of Architects (AIA), recorded a reading of 51.7 in September 2021 — its 20th consecutive month of increased demand for architecture and design services (any score above 50 indicates growth from the previous month). Despite a slight decline from August's reading of 53.3, the September reading, according to the AIA, indicates that business conditions nationally at architecture firms have remained generally strong — backlogs at firms remained robust, at an average of seven months as of the end of September, which is near record highs. When asked about revenue expectations for the full-year 2022, the majority of architectural firm leaders (59%) indicated that revenue at their firms was expected to increase relative to 2021, for an average growth rate of 6.8%. Large firms reported the highest expected revenue growth rate, at an average of 10.9%.

Aside from billings, September saw continued (albeit slowing) growth in new project inquiries, with a 53.6 reading (compared to August's 57.9 reading). Design contracts dipped marginally in September to 50.7, from 52.3, but remain within the range of "strong" growth, and confirm that developers are actively starting new projects, according to the AIA. While the overall number of inquiries into new projects declined slightly in September, the value of projects remained strong, leaving month-over-month billings and activity outlook nearly unchanged. Regionally, business conditions improved across all four US regions in September, with growth the strongest for firms located in the Northeast and Midwest — two regions that have begun to rebound after experiencing billing declines in nine of the previous 12 months; the Northeast, specifically, recorded its fastest pace of growth in recent years. In August, all building sectors — institutional, multifamily residential, commercial/industrial and mixed practice — reported an increase in billings, with the strongest growth observed in multifamily residential and institutional projects. September saw this growth curve flatten, with the multifamily residential and commercial/industrial sectors falling below 50 for the first time in the post-pandemic era, with readings of 49.6 and 47.9, respectively.

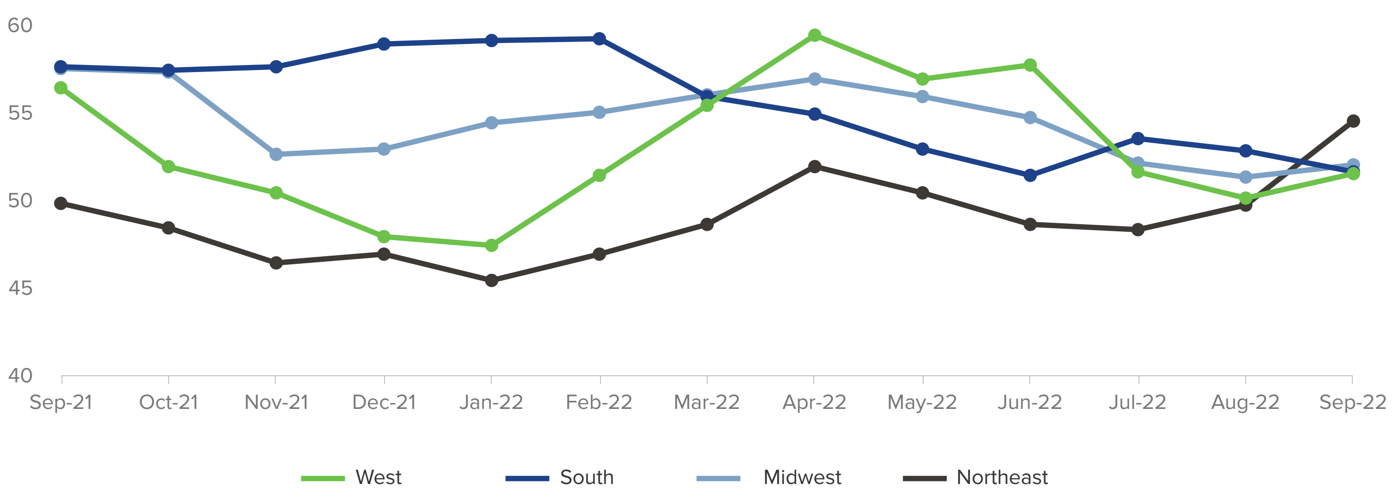
Architecture Billings Index



Source: American Institute of Architects

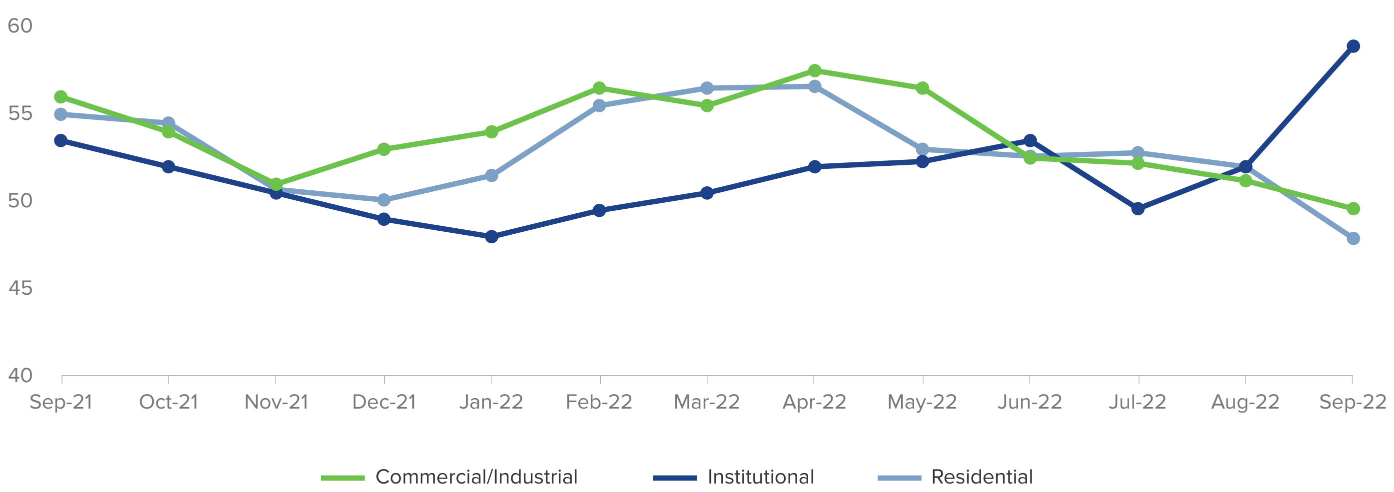
> "Conditions seem to have shifted for us. Before, we were doing about 70% residential work — since the Federal Reserve increased interest rates, our residential work has tailed off while commercial work remains strong, and we are now at about a 50/50 split."
>
> **SPOKESMAN FROM A NORTHEAST-BASED FIRM**
> IN RESPONSE TO THE JULY 2022 ABI SURVEY

Architecture Billings Index by region



Source: American Institute of Architects

Architecture Billings Index by sector



Source: American Institute of Architects

Enduring market trends

Oaklins

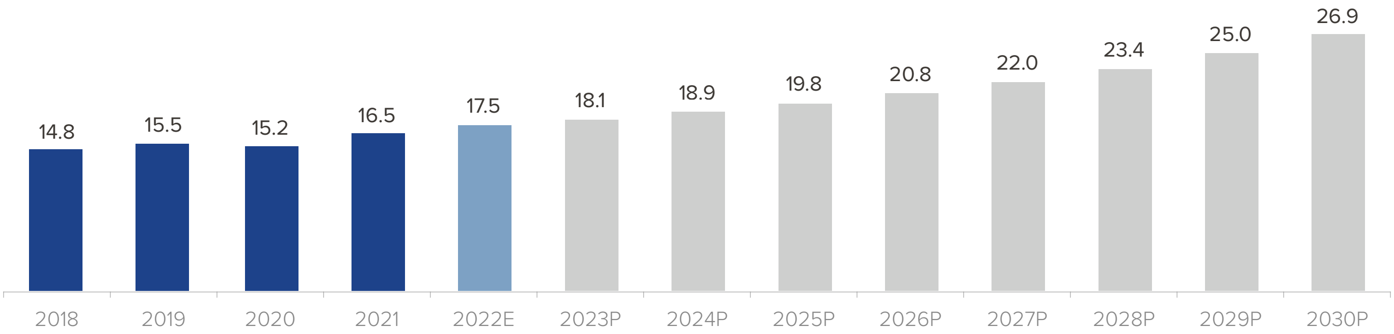
Key areas such as indoor air quality, natural lighting and home functionality play a role in ongoing trends

INDOOR AIR QUALITY & HVAC: The importance of the indoor environment to human health is becoming an increasingly studied and scrutinized area, particularly in the wake of the COVID-19 pandemic. The importance of indoor air quality in relation to human health is undeniable, as Americans spend an average of ~90% of their time indoors, where pollutant levels are higher than outside. Indoor pollution is estimated to cause thousands of cancer deaths and hundreds of thousands of respiratory health problems every year. Recent research performed by Harvard scientists uncovered the magnitude of the impact that indoor air quality has on human performance — the researchers manipulated carbon dioxide levels, ventilation rates and concentration of toxic chemicals found in office settings to observe the effects. Participants subject to the study-defined "improved conditions", primarily centered around improved ventilation rates, demonstrated an 8% increase in productivity over participants who weren't subject to improved conditions, which equates to a US$6,500 annual increase in productivity per employee. In another scenario, one set of participants was given a cognitive test in a typical office setting, while the other was given the test in a "green space" where volatile organic compounds were removed — the test subjects in the green space scored 60% higher on the tests, and when layered with improved ventilation as well, scored 100% higher on the tests.

As workers return to the office and economic activity continues to normalize in a post-pandemic environment, there has become a heightened focus by employers, employees and consumers alike on maintaining healthy indoor environments. Now, more than ever before, building occupants need and want reassurance that owners and operators of buildings are working to make occupant health and wellness a priority. Millennials, who will soon become the largest workforce cohort, overwhelmingly desire healthy workspaces, with 78% saying workplace quality is a deciding factor in a job search, while 69% are willing to trade other benefits for healthier working environments. An MIT report analyzing data about commercial buildings from 2016 to 2020 found that commercial properties with health building certifications garnered rental premiums of 4–7% percent per square foot relative to non-certified peer buildings; furthermore, nearly one in two building owners (46%) reported leasing their healthy building space more quickly than their conventional properties.

> "Much attention is paid to the quality of outdoor air — that is one of the main roles of the US Environmental Protection Agency. But people spend much more time indoors, where we are routinely exposed not just to environmental pollutants but to indoor ones ranging from pathogens to cooking fumes to chemicals released by furniture."
>
> **TANYA LEWIS**
> SCIENTIFIC AMERICAN

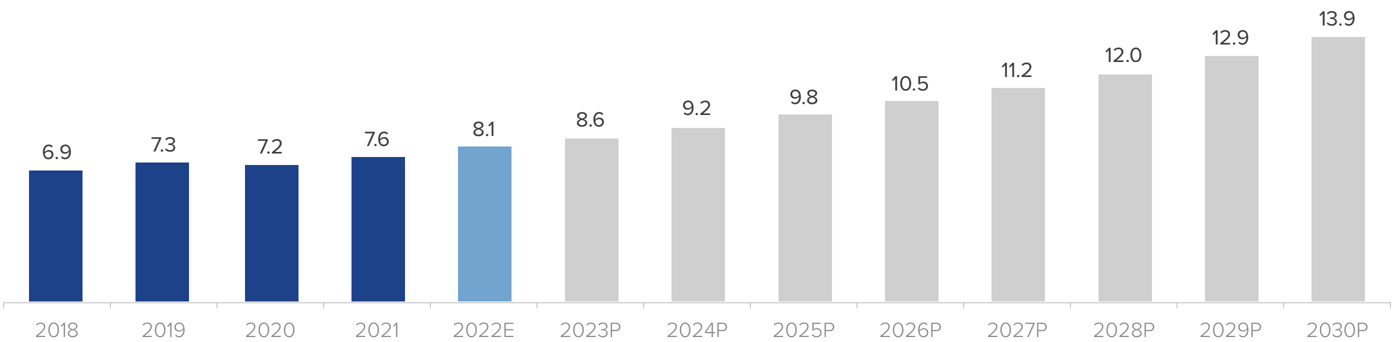
US HVAC systems historical & projected market size (US$ in billions)



Source: Grandview Research

This heightened focus on the indoor environment is expected to sustain demand for HVAC parts and systems for both commercial and residential applications for years to come. While air-conditioning is the fastest-growing segment of the HVAC market, due to increased focus on the benefits of improved ventilation, it is the ductless mini-split sub-segment of the market that is garnering significant attention. According to Oil & Energy, the US ductless mini-split market has more than doubled over the last decade and continues to experience strong growth tailwinds. There are many factors driving such growth: mini-split systems are (i) more energy-efficient and quiet, (ii) easier to install, and (iii) less expensive for ongoing use than traditional air-conditioning systems, while also benefiting from public-sponsored rebate and incentive programs. The Northeast USA, characterized by wide ranges of annual temperatures and aged residential infrastructure that often lacks proper ducting, is a critical driver of the market — the Northeast accounts for over 40% of ductless sales, nearly twice as much as the next largest region, which is the South, at 22%. Ductless mini-splits make for perfect retrofit add-ons to homes and are a great option in homes lacking ductwork.

US ductless mini-split historical & projected market size (US$ in billions)



Source: Grandview Research

NATURAL LIGHTING & GLASS: Glass continues to be an increasingly utilized building material in modern architecture. Viewed as a green element in construction, glass has strong aesthetic appeal (it helps blend interiors with exteriors), has reuse and recycle value, and due to its advanced technology of heat build-up control, can maintain the inner temperature of a building during both summer and winter months. Glass is not only used for windows and doors, but also in the walls, roofs and skin of buildings, which contributes to the façade — its translucent character can make spaces feel more pleasant and roomy.

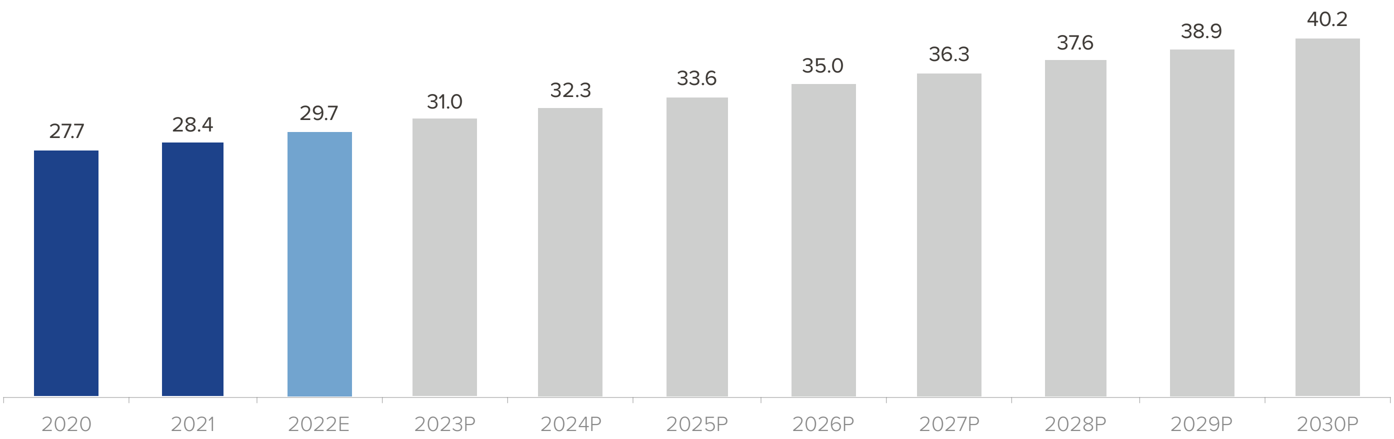
Glass also has functional benefits including the enablement of natural light in indoor spaces. Natural lighting has been found to boost people's mood and help ward off depression — this can be particularly beneficial in climates that experience

> “There is increasing evidence that exposure to light during the day — particularly in the morning — is beneficial to your health via its effects on mood, alertness and metabolism. Workers are a group at risk because they are typically indoors, often without access to natural or even artificial bright light, for the entire day.”
>
> **PHYLLIS ZEE**
> D, PHD, A NORTHWESTERN MEDICINE NEUROLOGIST AND SLEEP SPECIALIST

seasonality, as the concept of “seasonal depression” is thought to be catalyzed by a lack of direct sunlight, which glass architecture and design can alleviate.

Additionally, natural light has been found to have significant positive effects on productivity — natural light is the best-known source of Vitamin D, the “sunshine vitamin”, which is a natural energy booster, and so can help increase productivity levels; another notable benefit of natural light is its assistance toward a better night’s sleep, which creates a positive feedback loop that can augment productivity. Further, natural light is easier on the eyes than artificial lighting, which can be tough on the human eye — certain types of artificial light can cause eye strain, leading to headaches, dry aches and even weaker vision over time; some artificial lighting can also cause some people to develop elevated stress responses. Finally, by replacing artificial light, natural light can result in energy savings in both commercial and residential settings. The biggest piece of research done on the positive effects of natural light in an office environment found that employee access to natural light and views improves their overall happiness and wellbeing (78%), workplace satisfaction (73%), work performance (70%) and organization commitment (70%).

US flat glass market size (US$ in billions)



Source: Statista

M&A trends

Oaklins

Following COVID-19-related slowdowns in 2020, the building products sector experienced prolific M&A activity, which lasted throughout 2021 and into the first quarter of 2022. The flurry of deal volume in the sector was driven by the aforementioned reasons — surging home prices, increasing building activity, and waves of homeowner renovations — supported by equity valuations in the public markets. However, private equity investors have recalibrated their theses in light of the shifting economic environment, which has resulted in slowed M&A activity in the building products sector through the second and third quarters of 2022 — investors are hyperfocused on supply chains, specifically input pricing and lead times, both of which have begun to show signs of easing in recent times. Further, investors remain focused on interest rates and inflation, the two primary drivers of homeownership affordability. In the medium-to-longer term, M&A activity in the sector should expand once investors grow comfortable with the direction of these variables, which have been responsible for slower activity in the last few months.

Private equity M&A activity

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Recent acquisitions of North American building product companies by private equity firms (as of November 2022)

Close date	Target	Acquiror/Investor	Description
23-Nov-22	ProSource	Blue Sea Capital	Value-added distributor of plumbing, bathroom, kitchen, lighting and related products
31-Aug-22	WindsorONE	Brightstar Capital Partners	Manufacturer of highly crafted fabricated wood products for interior and exterior applications
26-Jul-22	Haywood	Southeast Building Supply (Building Industry Partners)	Provider of lumber, millwork, door, window, countertop and custom cabinet products
25-Jul-22	Cornerstone Building Brands (NYSE:CNR)	Clayton, Dubilier & Rice	Manufacturer of exterior building products
5-Jul-22	Reborn Cabinets	Renovo Home Partners (Audax Private Equity)	Provider of bathroom remodeling and window installation services
14-Jun-22	Wallace Building Supply	Southeast Building Supply (Building Industry Partners)	Distributor of framing materials, trusses, roofing, decking and railing, brick and mortar and wood fencing
1-Jun-22	NEWPRO Operating	Renovo Home Partners (Audax Private Equity)	Manufacturer of home improvement products
1-Jun-22	CSI Geoturf	Clayton, Dubilier & Rice	Distributor of civil site construction geosynthetic and landscape products
25-May-22	Victory Lumber	Astara Capital Partners	Operator of a sawmill intended to manufacture timber products
20-May-22	Thermotec Glass	M3 Glass Technologies (LongWater Opportunities)	Manufacturer and distributor of exterior insulated glass
4-May-22	Cancos Tile & Stone	Mill Point Capital	Distributor and retailer of high-end stone and porcelain tile
3-May-22	Pacifica Wholesale Tile & Stone	Sun Capital Partners	Distributor of stone slab and tile products
2-May-22	StormFitters	Leonard Green & Partners	Provider of remodeling and replacement products and services
2-May-22	Specialty Fence Wholesale	Fencing Supply Group (The Sterling Group)	Distributor of vinyl and aluminum fencing products
1-May-22	Somerset Hardwood Flooring	Bauwerk Parkett (EGS Beteiligungen)	Manufacturer of flooring products
29-Apr-22	Oldcastle BuildingEnvelope	KPS Capital Partners	Manufacturer, fabricator and distributor of architectural hardware, glass and glazing systems
14-Apr-22	Associated Materials	Strategic Value Partners	Manufacturer and distributor of exterior building products
4-Apr-22	Crown Components	Bain Capital	Manufacturer of structural roof and floor trusses
8-Mar-22	Associated Materials (NAS: SIDE)	Strategic Value Partners	Manufacturer and distributor of exterior residential building products
28-Feb-22	Tile Redi Holdings	Mayfair Capital Partners	Manufacturer of highly engineered, patented shower products
9-Feb-22	Excel Interior Door	Drum Capital Management	Manufacturer of interior wooden doors
2-Feb-22	AHF Products	Paceline Equity Partners	Manufacturer and distributor of wood flooring products intended to serve the residential and commercial markets
1-Feb-22	Specialty Fence Wholesale Jacksonville	The Sterling Group	Distributor of vinyl and aluminum fencing products
13-Jan-22	The Recreational Group	Sentinel Capital Partners	Designer and manufacturer of residential and commercial recreational surfacing products
12-Jan-22	Essex Coatings	Salt Creek Capital, The Cambria Group	Manufacturer and distributor of hardwood flooring products intended for floor construction
11-Jan-22	Applegate Holdings	Industrial Opportunity Partners	Manufacturer and distributor of cellulose insulation
11-Jan-22	Fi-Foil Company	Validor Capital	Manufacturer and distributor of reflective insulation and radiant barrier products
3-Jan-22	National Millwork	Littlejohn & Co.	Manufacturer of doors, hardware and trim products

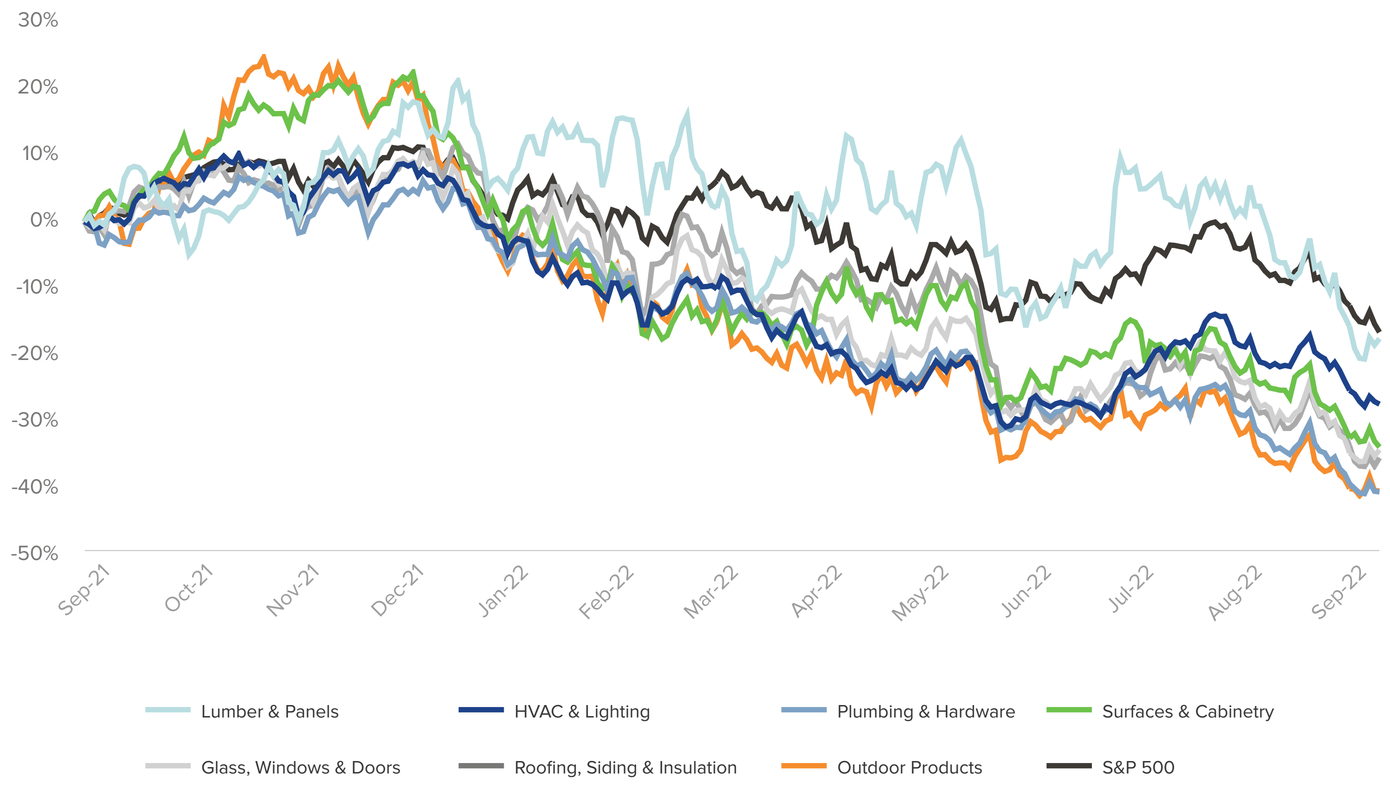
Recent exits from North American building product companies by private equity firms (as of November 2022)

Close date	Target	Seller	Buyers	Description
23-Nov-22	ProSource	CID Capital	Bue Sea Capital	Value-added distributor of plumbing, bathroom, kitchen, lighting and related products
23-Aug-22	Quality Aluminum Products	Blackford Capital	Gibraltrar (Nasdaq:ROCK)	Manufacturer and distributor of aluminum and steel building products
18-Jul-22	Construction Resources	Monomoy Capital	International Designs (Mill Point Capital)	Distributor of surfaces, flooring, kitchen, bath and other building products
11-Jul-22	Barrette Outdoor Living	TorQuest Partners	Oldcastle APG	Manufacturer of wood-alternative fence and railing products intended to enhance and transform outdoor space
24-Jun-22	C.H.I. Overhead Doors	KKR	NUCOR	Manufacturer of overhead doors, rolling steel doors and rubber doors
22-Jun-22	United Poly Systems	Industrial Opportunity Partners	Atkore (NYSE:ATKR)	Manufacturer of High Density Polyethylene (HDPE) pressure pipes and conduits
7-Apr-22	Marley Limited	Inflexion Partners	Marshalls	Manufacturer and supplier of roof systems for the construction market in the UK
18-Mar-22	Forterra	Lone Star Funds	Quikrete Holdings	Manufacturer of concrete pipe and precast products
2-Jan-22	AHF Products	American Industrial Partners	Paceline Equity	Designer and manufacturer of hardwood flooring products

GUIDELINE PUBLIC COMPANY PERFORMANCE — BUILDING PRODUCTS

The building products sector experienced robust growth in 2021, as the overall sector saw its equity value rise by ~28%, in line with the ~28% increase to S&P 500 during that year. The industry's strong performance was driven by surging demand for single-family homes, as well as a prolific wave of homeowner renovation/remodeling amid the persistence of the COVID-19 pandemic. Homebuyers and remodelers alike were driven by low mortgage rates and tight inventory, which (i) resulted in home prices surging to all-time highs, and (ii) motivated many homeowners to take cash out of their homes to execute large-scale home renovation projects. However, the story has been different for the building products sector in 2022. As of September 30, the sector had declined ~30%, compared to the ~25% decline in the S&P 500 over the same period. The sector's poor performance to that date was largely attributable to the myriad of aforementioned factors: (i) rising interest rates reducing homeowner affordability and dampening near-term demand, (ii) rising input costs and shortages, and (iii) increased lead times due to supply chain disruption. The construction industry overall is suffering from labor shortages and slow-downs, and is projected to need nearly two million additional workers to keep up with future expected future demand. While the short-term outlook is cloudy, the long-term outlook for the sector remains strong — demand for domestic housing is expected to experience sustained tailwinds over the next decade, largely driven by the coming-of-age of the largest potential homebuying cohort the nation has ever seen. Further, the continuously evolving American economy and agile real estate investment sector will continue to transform commercial property to meet market demand, which is largely for multifamily, warehouse and industrial spaces. The need to erect additional supply in these sectors will continue to fuel the commercial construction and, as a result, building product markets for years to come, with an impending wave of large-scale property retrofitting and repurposing.

One-year building products stock performance



Source: Capital IQ. Market data through 30 September 2022

Five-year building products stock performance

Source: Capital IQ. Market data through 30 September 2022

TM CAPITAL BUILDING PRODUCTS SECTORS, EQUALLY WEIGHTED, COMPRISING THE FOLLOWING COMPANIES:

1. Lumber & Panels: Canfor, LPX, Norbord, West Fraser
2. Glass, Windows & Doors: American Woodmark Corporation, Apogee Enterprises, Assa Abloy, CRH, Fortune Brands Home & Security, Masonite International Corporation, PGT Innovations
3. HVAC & Lighting: Acuity Brands, Daikin Industries, Eaton Corporation, Johnson Controls, Koninklijke Philips, Lennox International, Schneider Electric, Trane Technologies
4. Roofing, Siding & Insulation: Beacon Roofing, Carlisle Companies, Compagnie de Saint-Gobain, James Hardie Industries, LPX, Owens Corning
5. Plumbing & Hardware: Assa Abloy, Fortune Brands Home & Security, Masco Corporation, Mueller Water Products, Newell Brands, Rexnord Corporation, Richelieu Hardware, Spectrum Brands Holdings, Stanley Black & Decker, Toto, Tyman, Villeroy & Boch
6. Outdoor Products: CRH, Maytronics, Pentair, Pool Corporation, Trex
7. Surfaces & Cabinetry: Caesarstone, Fortune Brands, Interface, Mohawk Industries, Panariagroup Industrie Ceramiche, Sherwin Williams, Tarkett, The Dixie Group, Trex Company

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