

Intelligent Investment

# 2022 U.S. Construction Cost Trends

REPORT

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Rising prices for  
labor and materials  
pressuring  
construction costs

CBRE RESEARCH  
JULY 2022



# Executive Summary

A confluence of events—including soaring construction demand, inflation, pandemic-related restrictions, supply chain disruptions, labor shortages and the war in Ukraine—are spurring rising costs and uncertainty across the construction industry.

CBRE's new Construction Cost Index forecasts a 14.1% year-over-year increase in construction costs by year-end 2022 as labor and material costs continue to rise. Escalation should stabilize to the 2%-4% range in 2023 and 2024, on par with historical averages.

Overall cost inflation for materials is expected to begin cooling by the end of 2022 and largely return to typical levels by mid-2023. However, given the large number of construction inputs—many of which are often subject to geopolitical risks such as tariffs and sanctions—costs for some materials may remain volatile.

Supply chain-related disruptions should begin to ease, but ongoing global labor and component shortages will hamper production and logistics capacity. As a result, long lead times and material shortages will likely continue in the short term.



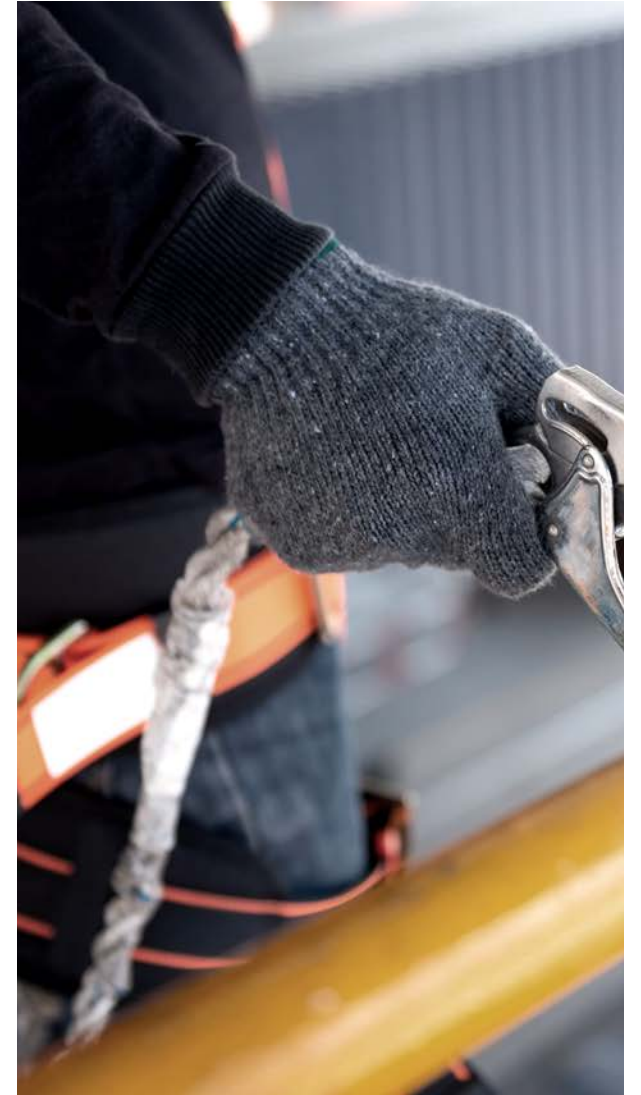
# Executive Summary (cont.)

The construction industry faces numerous labor challenges, including a smaller talent pool in the aftermath of the Great Recession, an aging workforce—one in five workers is currently older than 55—and strong competition from other industries like logistics.

Labor shortages are expected to persist for the near term, increasing wage pressure. Because construction wage growth has lagged the national average through the pandemic, construction labor escalation is likely to be higher in 2022.

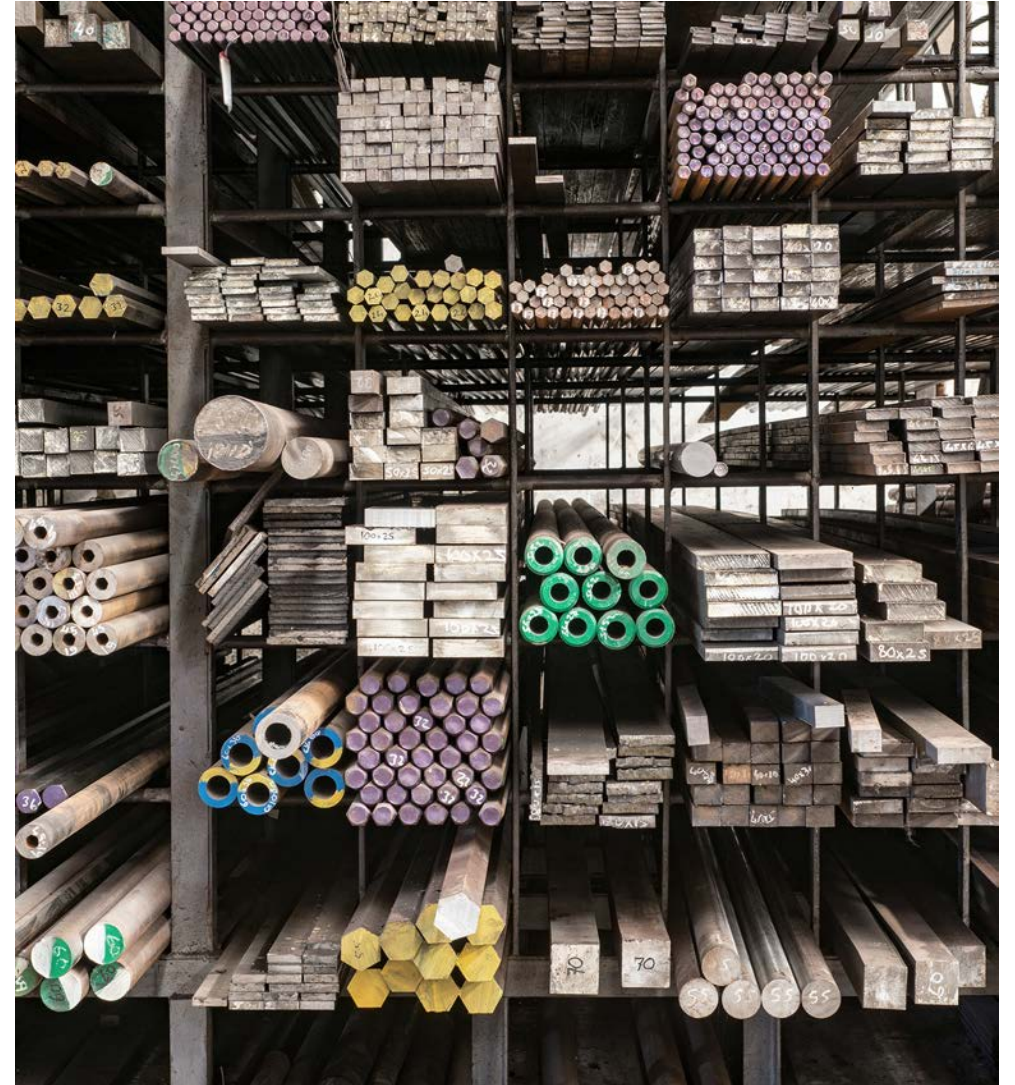
As demand for new construction projects increases, contractors may be able to pass along higher input costs. The extent to which this happens will depend on how many builders delay or cancel projects due to concerns over input prices, rising interest rates and economic uncertainty.

Despite headwinds, construction demand is expected to remain strong for the near term. Although the possibility of an economic downturn should be taken seriously, considerable pent-up demand for new construction—including a nationwide housing shortage—and government infrastructure projects should largely sustain activity. As contractor backlogs grow, margins should increase, pushing up total construction costs.



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01

# Introduction

# Estimating construction costs amid uncertainty

Midway through 2022, the U.S. construction industry continues to grapple with numerous challenges, including labor shortages, supply chain disruptions and higher materials costs—all exacerbated by the Russia-Ukraine war, shifting trade policy, rising interest rates and pandemic-related restrictions.

The construction industry thrives on predictability, and periods of uncertainty and volatility make estimating and managing costs more difficult. Not only was COVID-19 an unforeseeable black swan event, but the resulting market impacts over the past two years have altered many of the typical approaches used to control costs. The result: unprecedented spikes in construction costs.

This report dissects the underlying components of total construction costs—labor, materials and margins— and identifies the factors driving higher costs. The analysis delves into construction activity trends, supply chain disruptions, labor shortages and cost escalations in materials. We discuss these trends in the context of major third-party cost indices and present a new proprietary CBRE Construction Cost Index that forecasts costs through 2024. The primary takeaway: 2022 is likely to see more abnormally high increases in average construction costs, with the CBRE Construction Cost Index rising 14.1% year-over-year by the end of 2022, but increases thereafter should moderate.

By better understanding the levers moving construction costs, we hope industry participants will be better positioned to navigate this challenging environment.



# Pandemic impacts ripple through construction cost chain

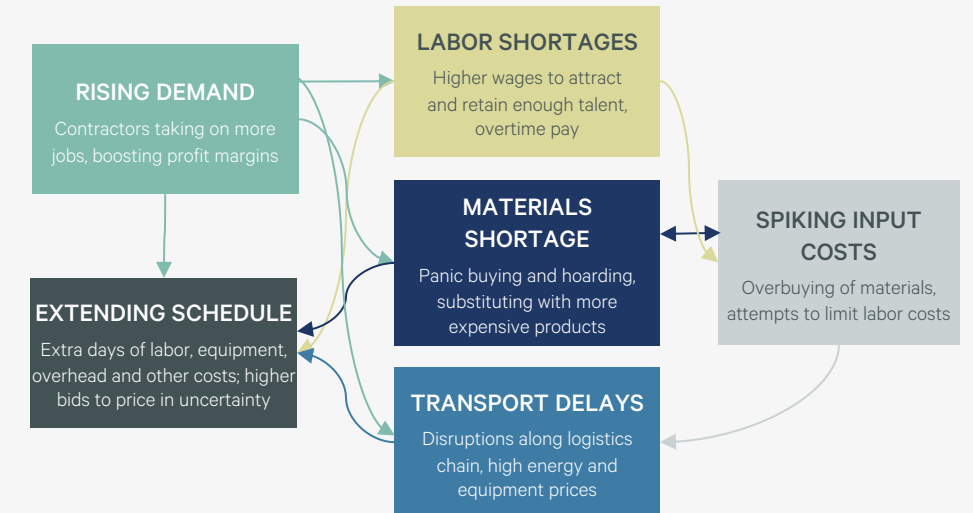
**COVID-19 precipitated shortages, delays and cost increases that continue to reverberate through the global economy in 2022.**

The construction industry has been among the most affected, given the on-site nature of the work (public health restrictions or waves of illness across crews can hamper productivity), the large quantities and wide variety of both materials and labor required, and the vulnerability of several key inputs to tariffs, quotas and geopolitical tensions.

Pent-up demand for construction projects in the aftermath of the initial pandemic lockdowns—particularly residential, as many people spent more time at home—drove an uptick in construction activity. However, the construction industry, like manufacturing, distribution and other sectors, was understaffed amid COVID-related layoffs, quits, illnesses and deaths.

The result: a perfect storm of interconnected factors that pressured costs. Figure 1 illustrates the interconnected set of challenges impacting the industry, how each challenge effects certain costs and how those impacts indirectly drive up costs for other factors.

**FIGURE 1:** Pandemic impacts on interconnected cost drivers






Source: CBRE Strategic Investment Consulting, April 2022.

# Construction costs are the sum of three main components

**This report examines the key trends impacting the primary drivers of total construction costs: materials, labor and margins.**

Shifts in prices for any one component do not translate one-to-one into the final cost. Materials generally represent the largest share of total cost, followed by labor and margins, but the weight of each component can vary significantly based on a project's location, property type, timeline and other factors.

**FIGURE 2:** Construction cost drivers and outlook

	Cost drivers	Outlook
<b>Materials</b> 	<ul style="list-style-type: none"> <li>Concrete, steel, lumber, energy and equipment are some of the key materials driving costs.</li> <li>Building size and type are major factors, since the super structure determines the type and amount of primary materials used.</li> <li>Supply chains, tariffs and other logistical factors play a major role in the cost of materials, especially when demand is high.</li> </ul>	<ul style="list-style-type: none"> <li>Supply chain disruptions will abate, but global labor and component shortages, inflationary pressures and pandemic-related restrictions will weigh on production and logistics capacity.</li> <li>Long lead times and material shortages will continue in the short term.</li> <li>Materials escalation will remain well above average in 2022.</li> </ul>
<b>Labor</b> 	<ul style="list-style-type: none"> <li>Labor costs are the wages and benefits paid to workers turning materials into finished products.</li> <li>Labor shortages pressure labor costs, either via increased wages to attract more workers or overtime to complete jobs when short staffed.</li> </ul>	<ul style="list-style-type: none"> <li>Labor shortages will likely persist in the near term, deepening wage pressure.</li> <li>Construction wage growth lags the national average, likely leading to higher construction labor costs in 2022, assuming steady construction demand.</li> </ul>
<b>Margins</b> 	<ul style="list-style-type: none"> <li>Margins represent the difference between the cost of materials and labor for a project, and the bid price received for it (i.e., profit).</li> <li>Margins fluctuate heavily based on market demand. Contractors and subcontractors operate with higher margins when construction jobs are plentiful.</li> </ul>	<ul style="list-style-type: none"> <li>Despite headwinds, construction demand is expected to increase as inflation eases, supported by pent-up demand and government initiatives.</li> <li>As contractor backlogs grow, margins should increase more significantly in 2022, pushing up costs.</li> </ul>

Source: CBRE Strategic Investment Consulting, April 2022.

# New CBRE index indicates that cost escalation will increase in 2022, moderate in 2023 and 2024

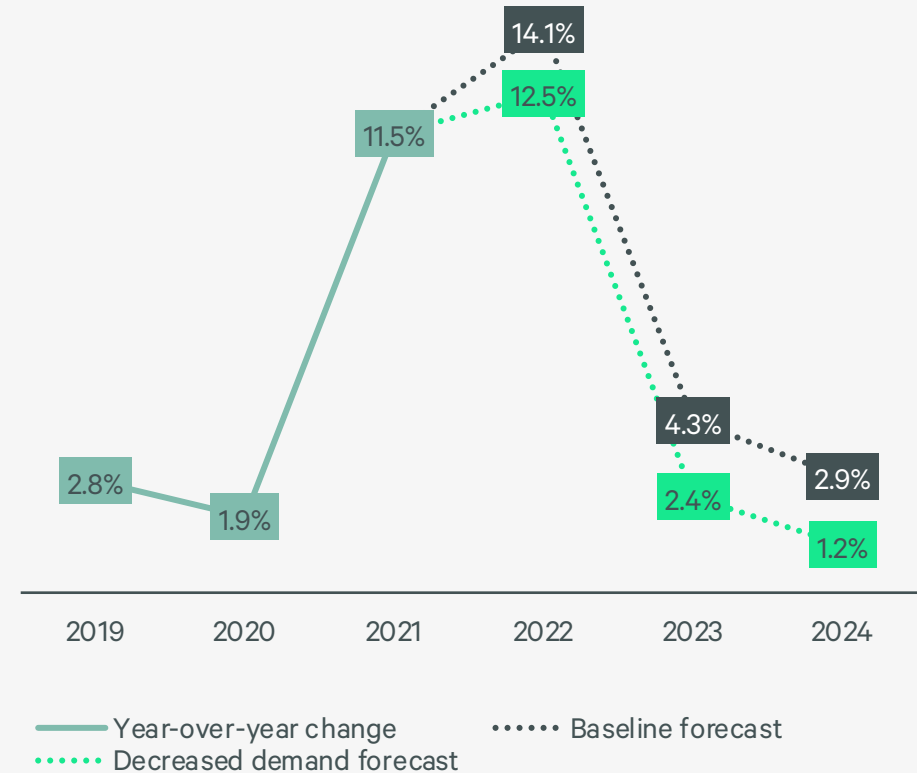
**This index incorporates the three key cost components to provide a comprehensive view of construction costs that can also be statistically modeled to estimate future escalation.**

The index increased 11.5% in 2021, markedly above the 2%-4% historical trend. Although we expect improvement in supply disruptions and broader inflation in late 2022, the significant price increases already seen year-to-date are unlikely to reverse, and further cost pressures will remain. As a result, construction costs are expected to rise 14.1% by year-end 2022 before stabilizing to around 4% in 2023 and around 3% in 2024.

These projections assume that margins account for a significant share of total construction costs and that construction demand will remain robust through 2024. If weaker-than-expected economic growth causes construction activity to slow significantly, we would expect cost increases in 2022 to be roughly on par with 2021 and then fall quickly to the mid-2% range in 2023 and the mid-1% range in 2024.

Section 06 provides more detail on the CBRE Index’s historical performance and presents our projections within the context of other industry benchmarks.

**FIGURE 3:** CBRE Construction Cost Index, recent trend and forecast scenarios



Source: CBRE Econometric Advisors, CBRE Strategic Investment Consulting, April 2022.

02

# Construction Activity

# Construction spending surging

**Spending rebounded quickly after the pandemic-induced slump of 2020.**

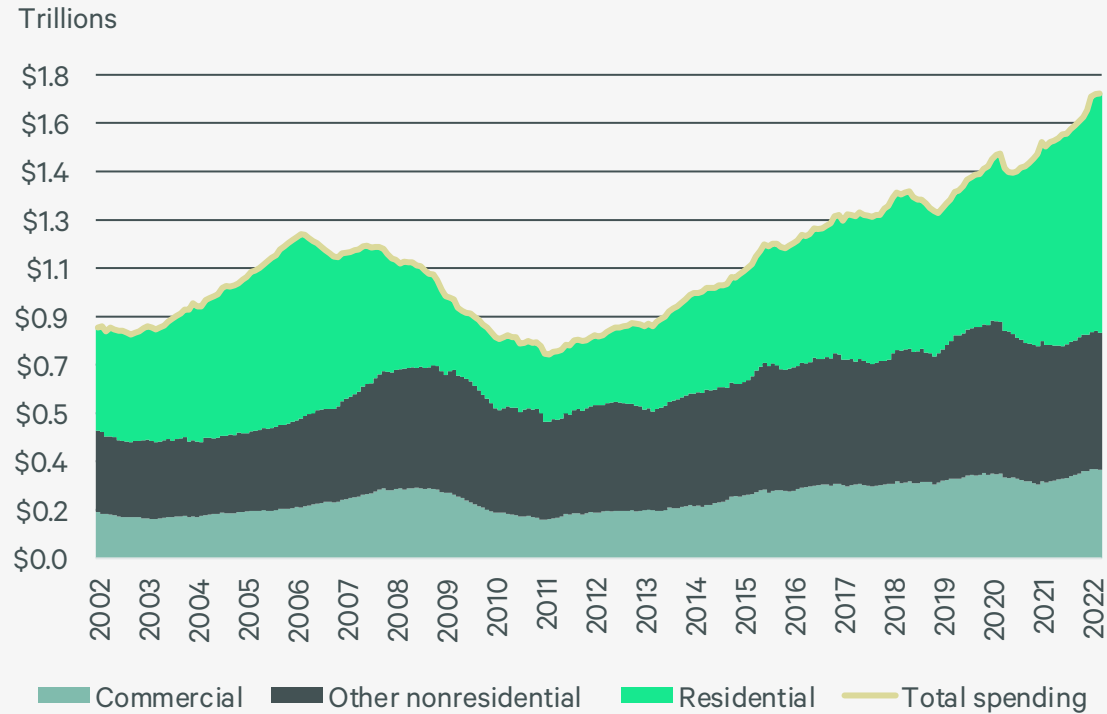
By late summer 2020, spending volume began rising as developers resumed projects that had been on hold and tentatively started new ones. Growth in total construction spending accelerated in 2021 as COVID-19 restrictions were gradually lifted and developers boosted activity in response to both a backlog of delayed projects and new demand from households and firms that had accrued extra capital during the pandemic.

Commercial construction activity has grown at a slower rate than residential construction, as lingering economic uncertainty has slowed the recovery, particularly for office. As of March 2022, commercial construction spending had not yet reached the pre-pandemic peak.

The increase in total spending is, in part, driven by inflating input prices (i.e., materials, labor) but, even when adjusted for inflation, spending is up 4.4% since January 2020.



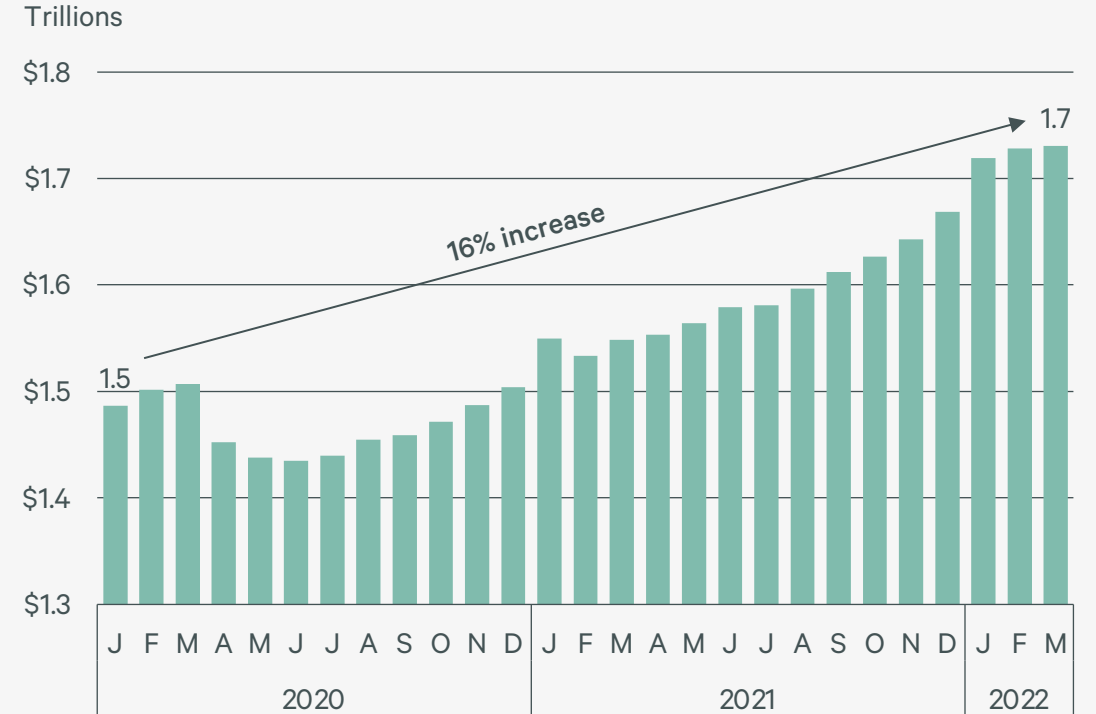
**FIGURE 4:** U.S. historical construction spending by sector



Note: Latest data as of March 2022, seasonally adjusted. Residential includes multifamily. Other nonresidential includes primarily education, civic and infrastructure-related spending.

Source: U.S. Census Bureau, CBRE Strategic Investment Consulting, April 2022.

**FIGURE 5:** U.S. total construction spending since pandemic onset



Note: Latest data as of March 2022, seasonally adjusted. Residential includes multifamily. Other nonresidential includes primarily education, civic and infrastructure-related spending.

Source: U.S. Census Bureau, CBRE Strategic Investment Consulting, April 2022.

# Residential projects driving construction volume

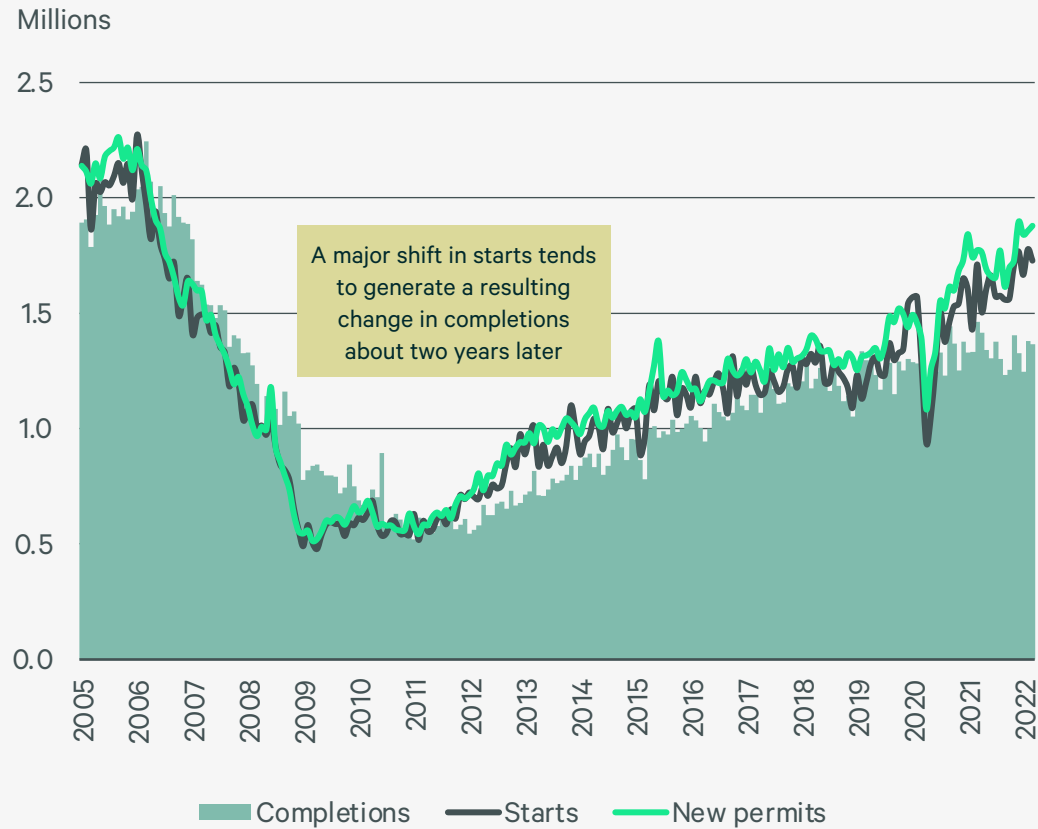
**Significant upticks in housing starts and residential permits should lead to more construction demand in 2022 and 2023.**

Completions of new residential units, both single-family and multifamily, trended downward from Q1 2021 to Q1 2022 due to a slowdown in starts during the depths of the pandemic. However, the marked rise in starts over the past three quarters will translate into a boost in completions by late 2022 and into 2023.

The increase in residential construction will continue to push demand for materials and labor, intensifying competition and cost pressures across the construction industry in the near term. However, rising mortgage rates may take some of the heat out of single-family residential demand, potentially causing new home starts to slow in 2023.

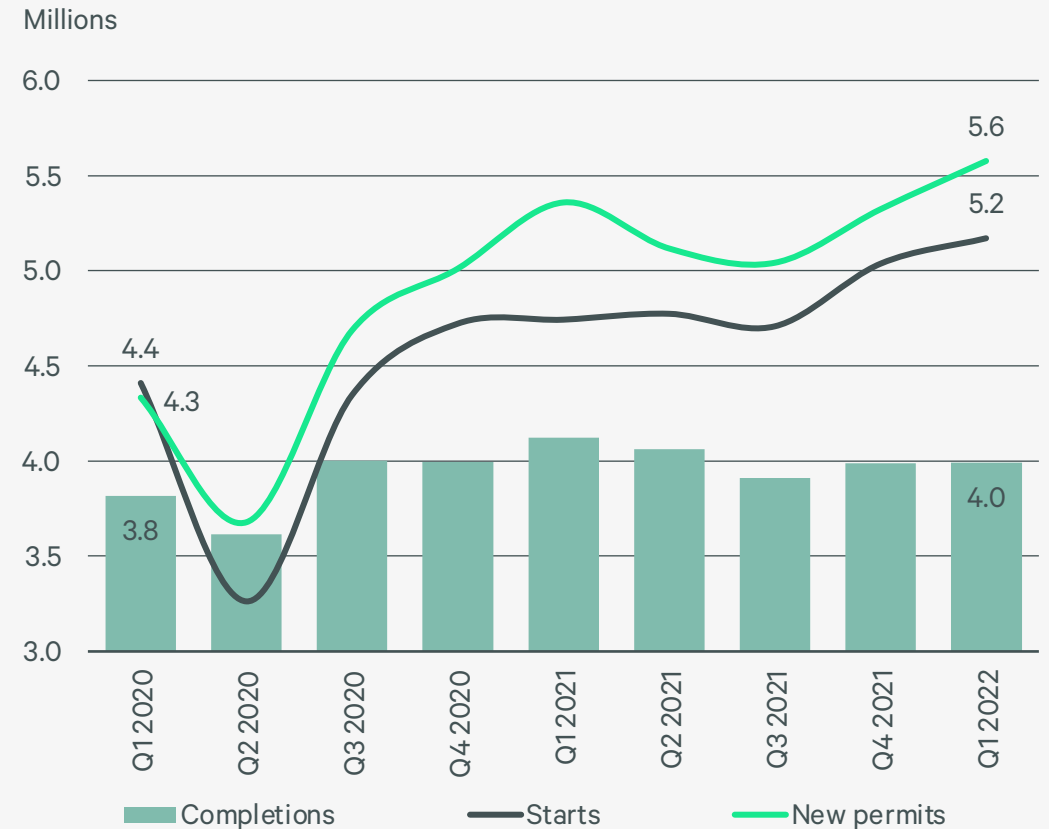


**FIGURE 6:** U.S. historical residential construction by phase



Note: Latest data as of March 2022, seasonally adjusted. Residential includes multifamily.  
 Source: U.S. Census Bureau, CBRE Strategic Investment Consulting, April 2022.

**FIGURE 7:** U.S. residential construction by phase since pandemic onset



Note: Latest data as of March 2022, seasonally adjusted. Residential includes multifamily.  
 Source: U.S. Census Bureau, CBRE Strategic Investment Consulting, April 2022.

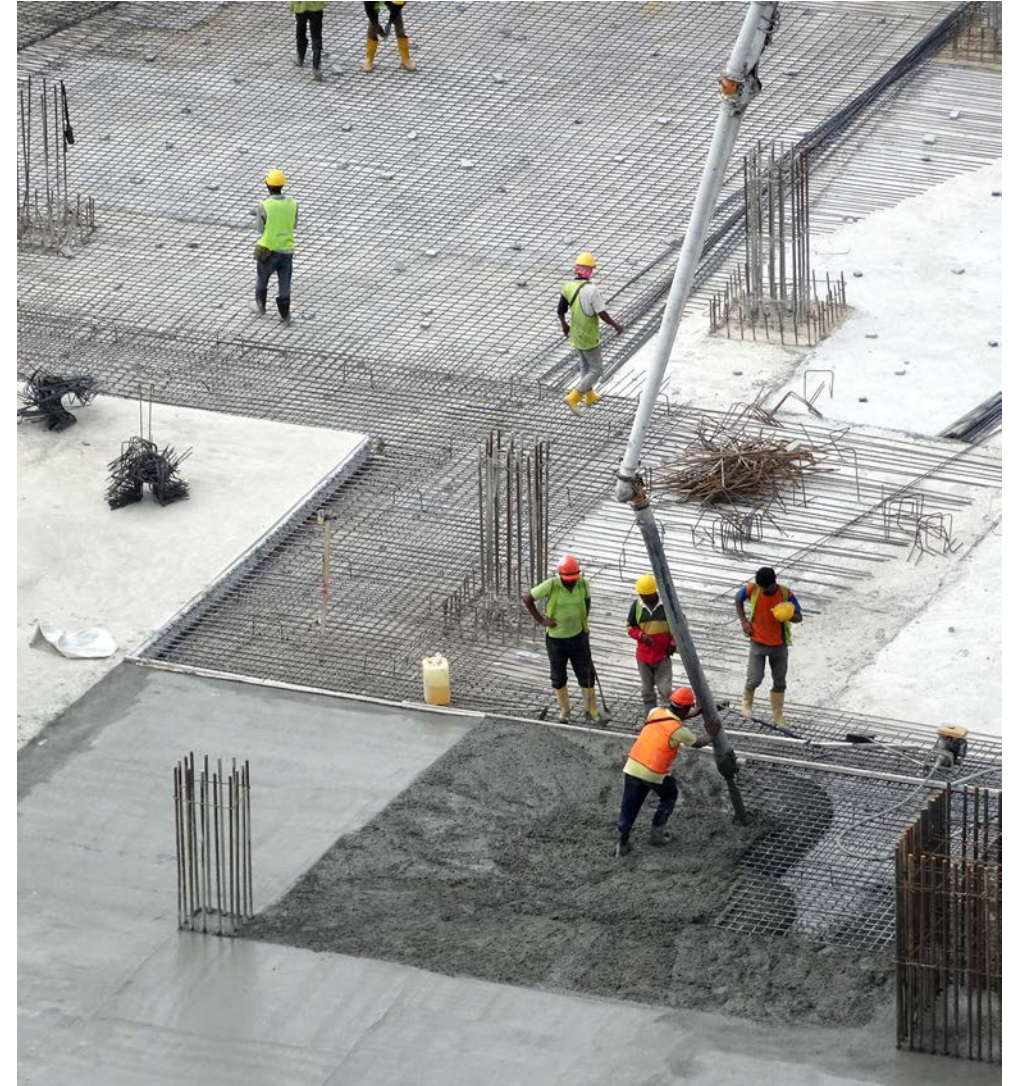
# Commercial construction expected to strengthen in 2022 before easing

**In square footage terms, total commercial completions across the four major property types slowed modestly in 2021, but will likely reach new highs in 2022.**

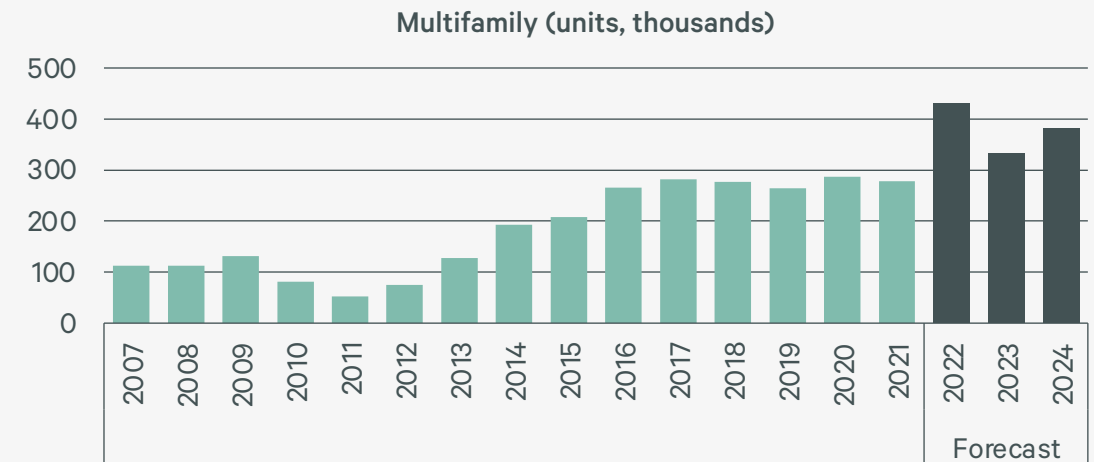
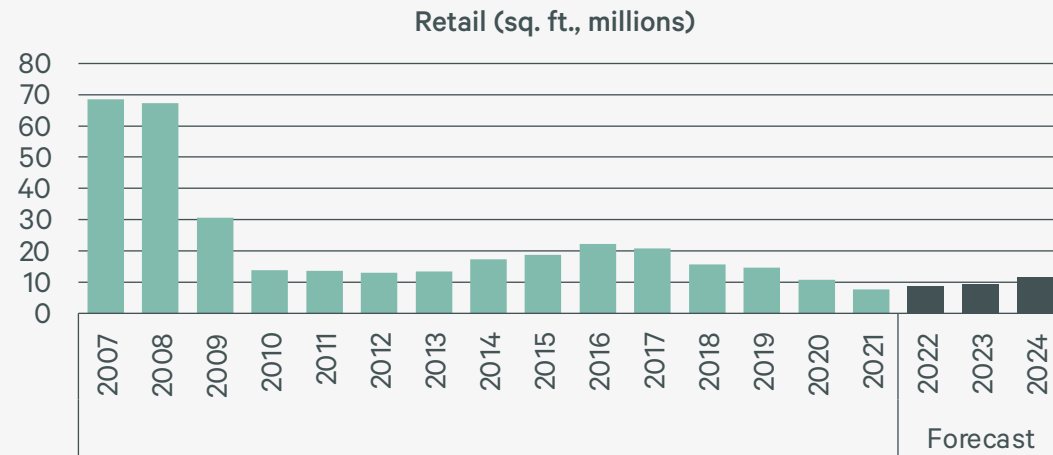
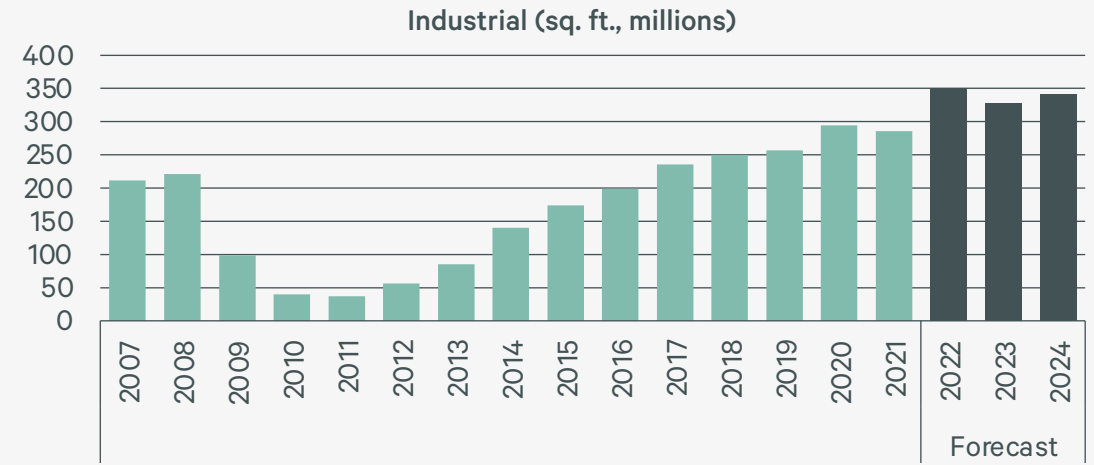
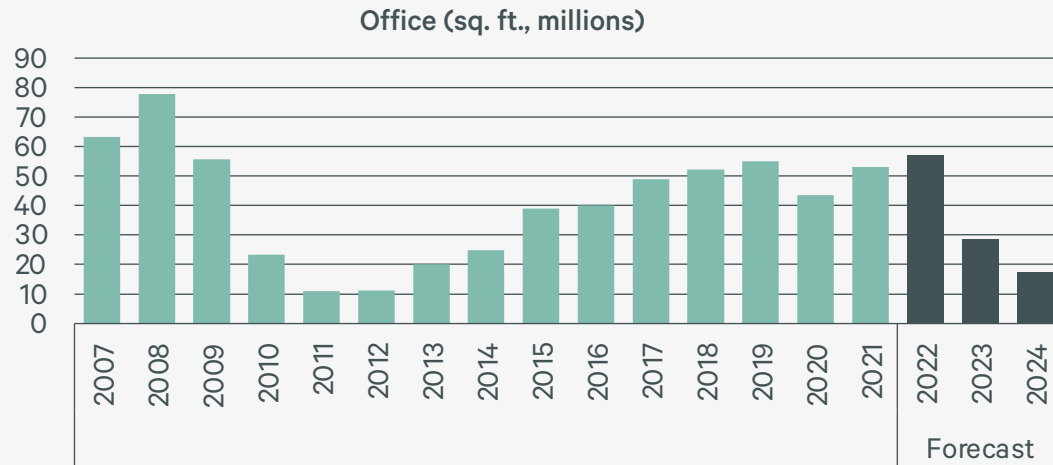
Trends vary across the property types, however. Industrial construction activity is expected to remain elevated for the next three years, which may place continued pressure on demand for materials like concrete and steel.

Multifamily construction will also remain a major driver of construction demand, pressuring lumber prices. Though completions will likely be somewhat more frontloaded in 2022, they are expected to exceed 2021 levels in each of the next three years.

Though office completions picked up in 2021 and should rise further in 2022 as projects underway come online, activity is expected to cool significantly thereafter as developers wait for more clarity on how corporate hybrid work plans impact demand.



**FIGURE 8:** Commercial construction completions by property type



Source: CBRE Econometric Advisors, CBRE Strategic Investment Consulting, June 2022.

# Strong commercial spending growth projected through 2023

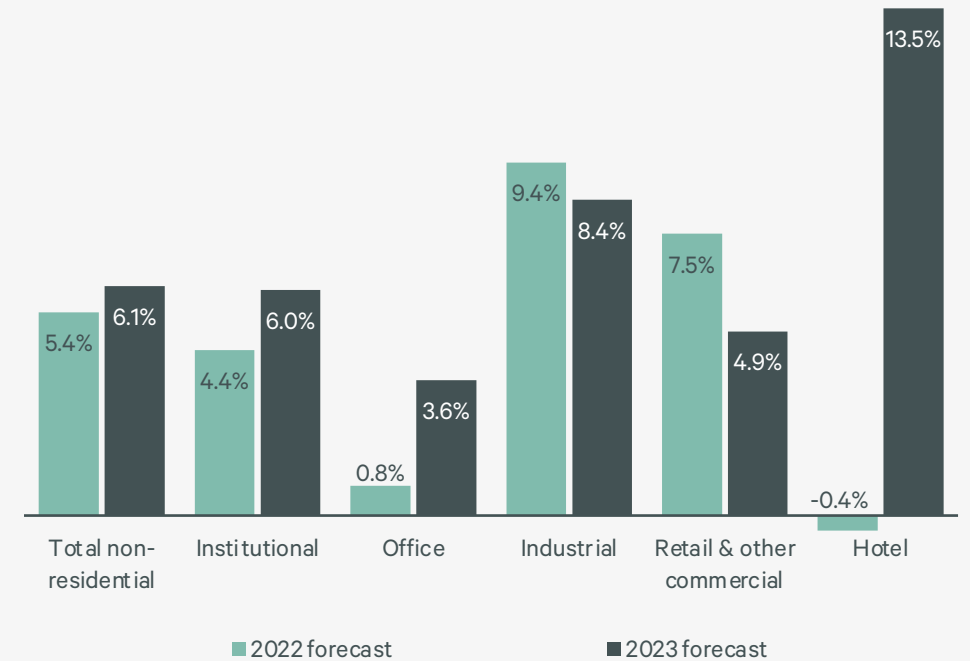
**Construction spending is expected to accelerate significantly in the next two years amid increased construction volumes and input prices.**

While projected completions in square footage terms measures construction momentum by the approximate number and size of projects, projected spending reflects expectations for the cost of those projects.

The latest projections from the American Institute of Architects (AIA) Consensus Construction Forecast panel (survey conducted in January 2022), which aggregates views from eight leading economic and industry forecasters, indicate significant growth for most nonresidential construction categories through 2023.

AIA expects spending growth in 2023 will generally outpace 2022's level—in contrast to the opposite trend forecasted for sq. ft. construction completions—largely due to higher costs, as more spending is required to complete the same amount of space.

**FIGURE 9: AIA Consensus Construction Forecast, annual spending growth by sector**



Source: American Institute of Architects, CBRE Strategic Investment Consulting, April 2022.

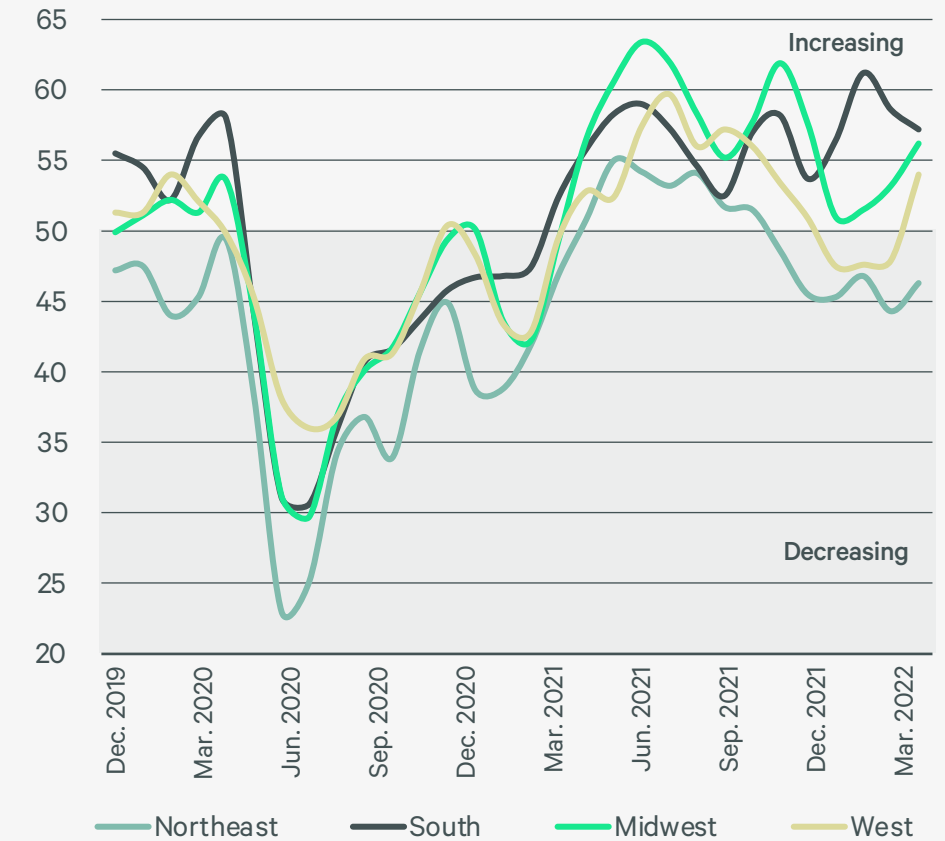
# Building activity not increasing evenly across regions

AIA’s work-on-the-boards data through March 2022 indicates that architectural billings are increasing in the South and Midwest but decreasing in the West and Northeast.

In recent months, growth has been strongest in the South, a change from 2021 when the Midwest led growth for all but one month of the year. As of March, the two regions moved back within one month of each other, as billings have softened year-to-date for the South and ramped up in the Midwest.

In the West and Northeast, growth had been trending slower since mid-year 2021, but both regions saw billings jump in March. In the West, billings returned to positive territory, but for the Northeast, the improvement meant only a smaller pace of decrease, with March marking the sixth consecutive month of fewer billings.

**FIGURE 10:** AIA Architectural Billings Index by region since pandemic onset



Note: Data is a three-month moving average.  
 Source: American Institute of Architects, CBRE Cost Consultancy, April 2022.

# Stable backlogs indicate healthy construction demand despite rising costs

Associated Builders and Contractors (ABC) reported that its Construction Backlog Indicator for the U.S. was up slightly at 8.3 months in March 2022, up 0.5 months from March 2021.

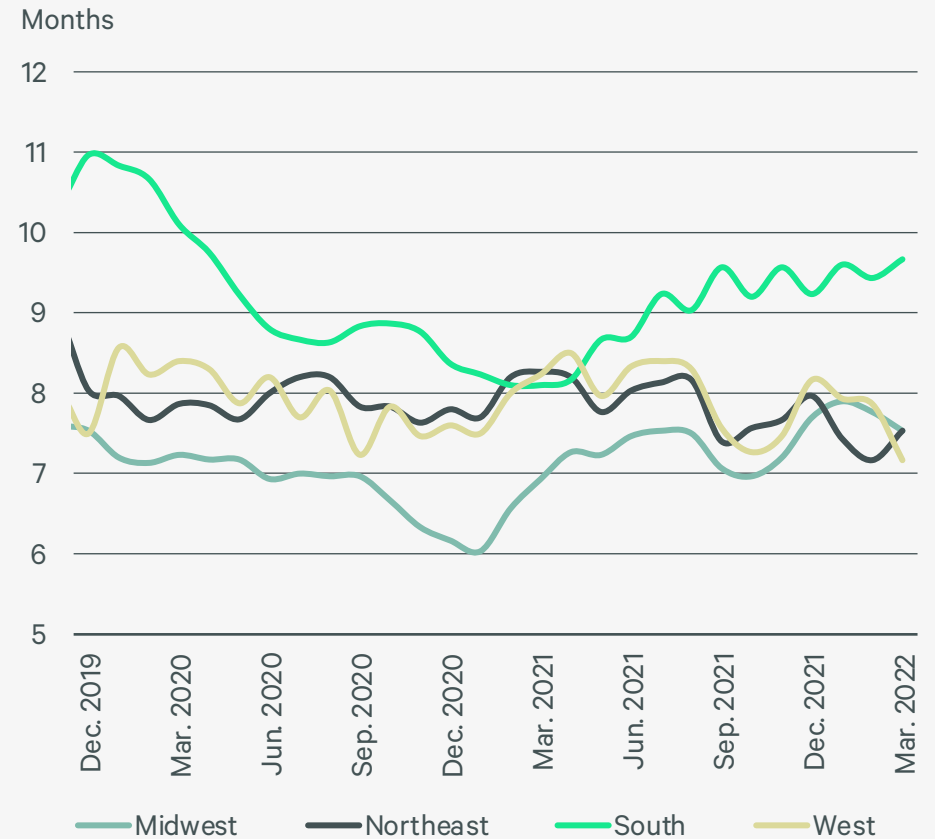
Because the backlog identifies the amount of construction activity currently in the pipeline, higher backlogs generally indicate greater construction demand.

However, only in the South was the backlog up notably from March 2021 (1.4 months). Backlogs for the West were down 1.1 months, while the Northeast and Midwest were up modestly (0.5 and 0.2, respectively).

Nationwide, the current backlog is down slightly from pre-pandemic levels, largely due to lack of available labor and materials, but has been largely stable over the past year.

Survey respondents also expect growth in profit margins in the coming months, indicating that contractors feel construction demand is strong enough to offset rising costs.

**FIGURE 11:** ABC Construction Backlog by region since pandemic onset



Note: Data is three-month moving average.  
 Source: American Institute of Architects, CBRE Cost Consultancy, April 2022.

# Leading indices indicate construction market growth

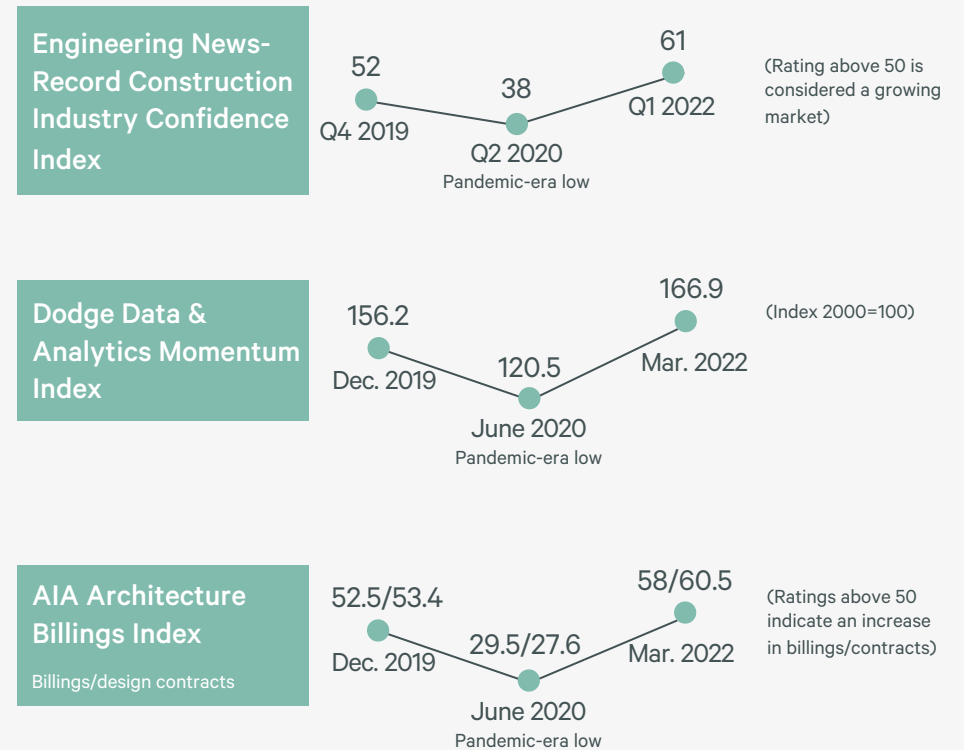
**Key industry sentiment indicators show construction conditions have significantly improved from 2020 lows and are up by an average of 12% from pre-pandemic norms.**

Engineering News-Record's Construction Confidence Index, which tracks the sentiment of executives at major construction companies on market conditions through the next 18 months, fell in both Q3 and Q4 2021, but ticked up one point in Q1 2022.

The Dodge Momentum Index measures the initial report for nonresidential projects in planning and is a leading indicator of construction spending. As of March 2022, the index was down slightly from highs in 2021 but well above pre-pandemic averages.

The AIA's Architecture Billings Index is an economic indicator for nonresidential construction activity, with a lead time of approximately 9-12 months. As of March, the index had returned to roughly match the rapid growth pace in mid-2021 with most architectural firms reporting steady growth in both billed projects and new contracts.

**FIGURE 12:** Summary of major industry leading indicators



Source: Engineering News-Record, Dodge Data and Analytics, American Institute of Architects, CBRE Cost Consultancy, CBRE Strategic Investment Consulting, April 2022.

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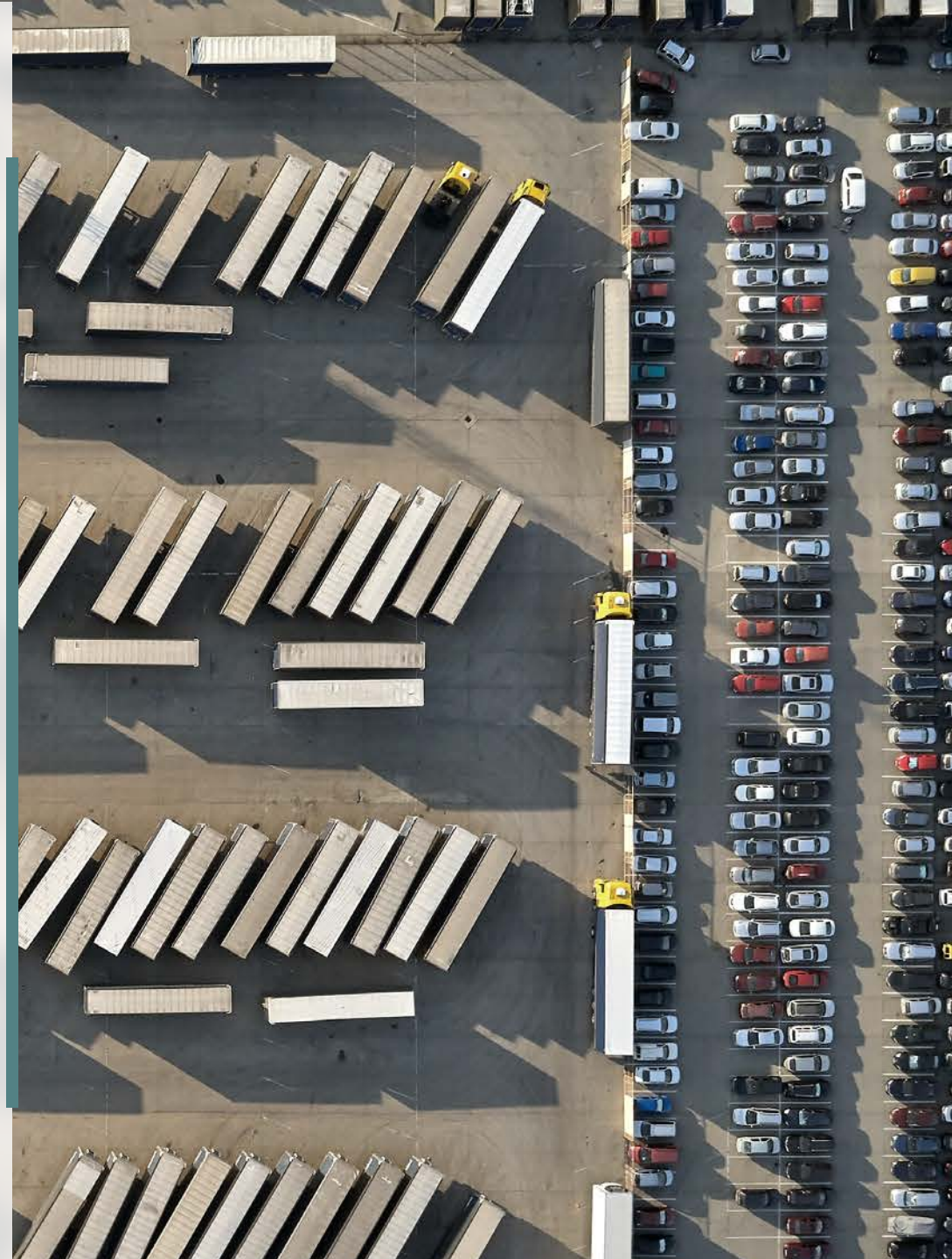
# Supply Chain Disruption

# Logistics issues causing major delays across the supply chain

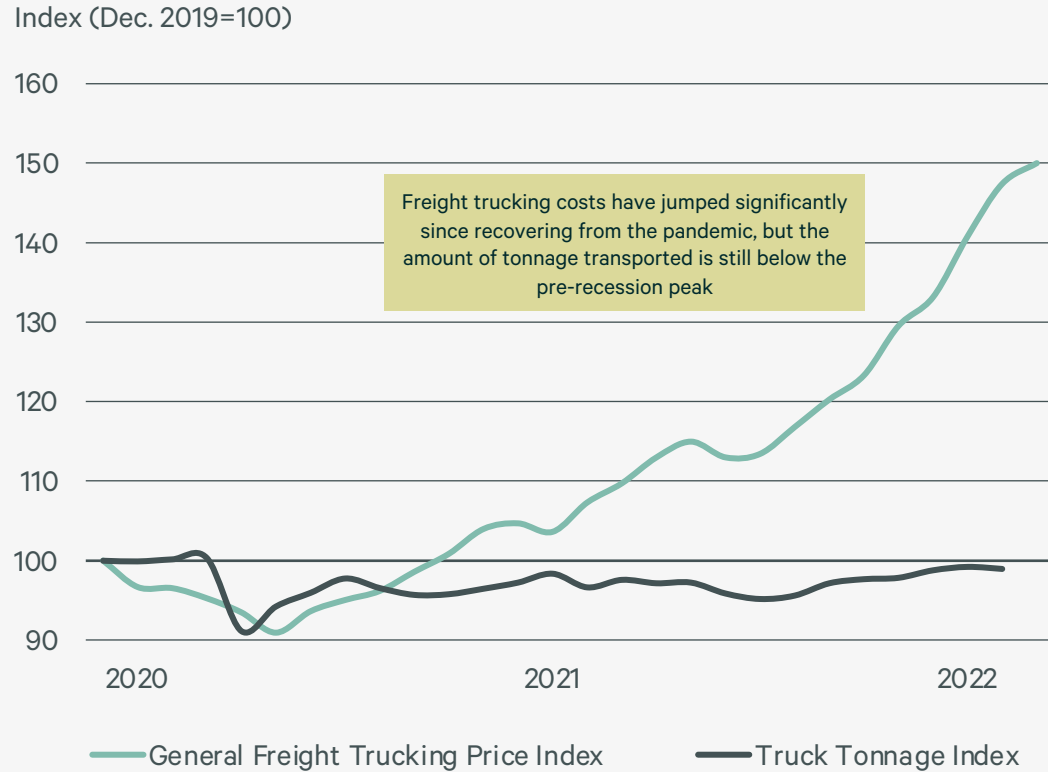
**Skyrocketing global shipping costs, combined with a backlog of domestic freight operations, are causing a shortage of goods and materials, inflating costs.**

Labor shortages in rail yards, manufacturing plants, warehouses and trucking companies are exacerbating delays at U.S. seaports. The American Trucking Association reported in October 2021 that the industry is short about 80,000 drivers and they expect that to increase to 160,000 by 2030.

To attract more drivers, the sector has boosted wages, but the recent increase in demand for transportation services has spurred the need for even more drivers. Barriers to entry for new drivers, like licensing, are making it more difficult for the industry to respond quickly to demand.

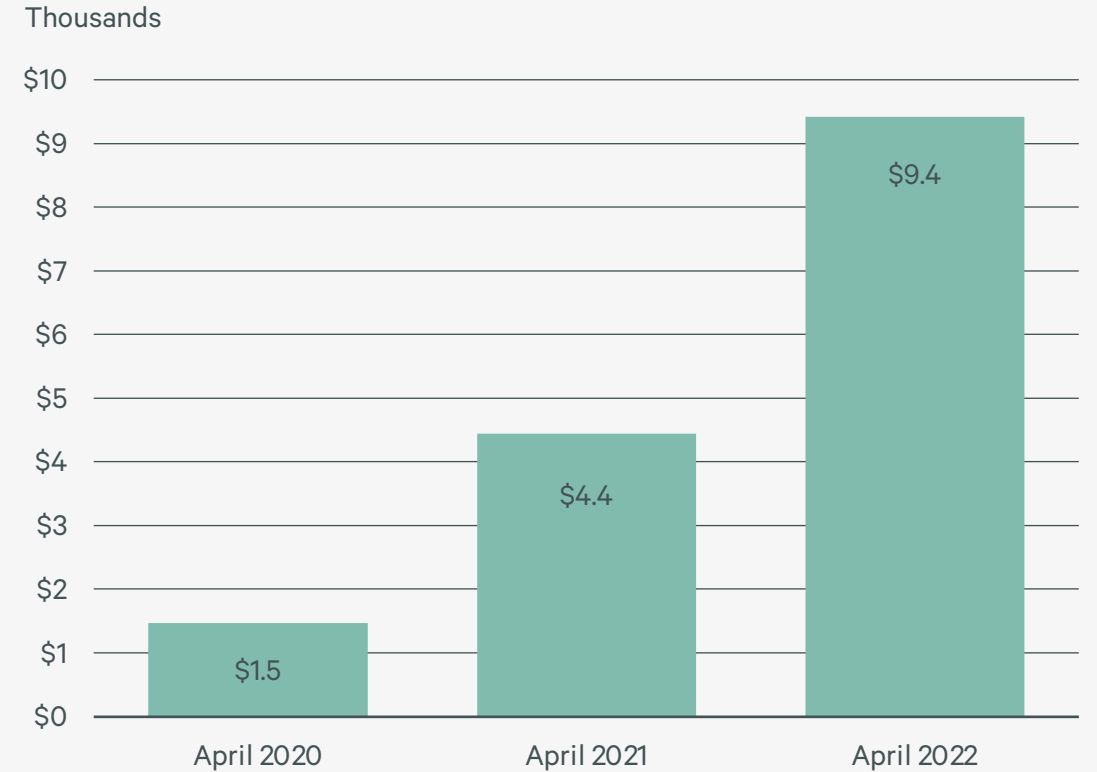


**FIGURE 13:** General freight trucking, cost vs. tonnage changes



Source: U.S. Bureau of Labor Statistics, Producer Price Index, U.S. Department of Transportation, CBRE Strategic Investment Consulting, April 2022.

**FIGURE 14:** Global market rate for 40-foot containers



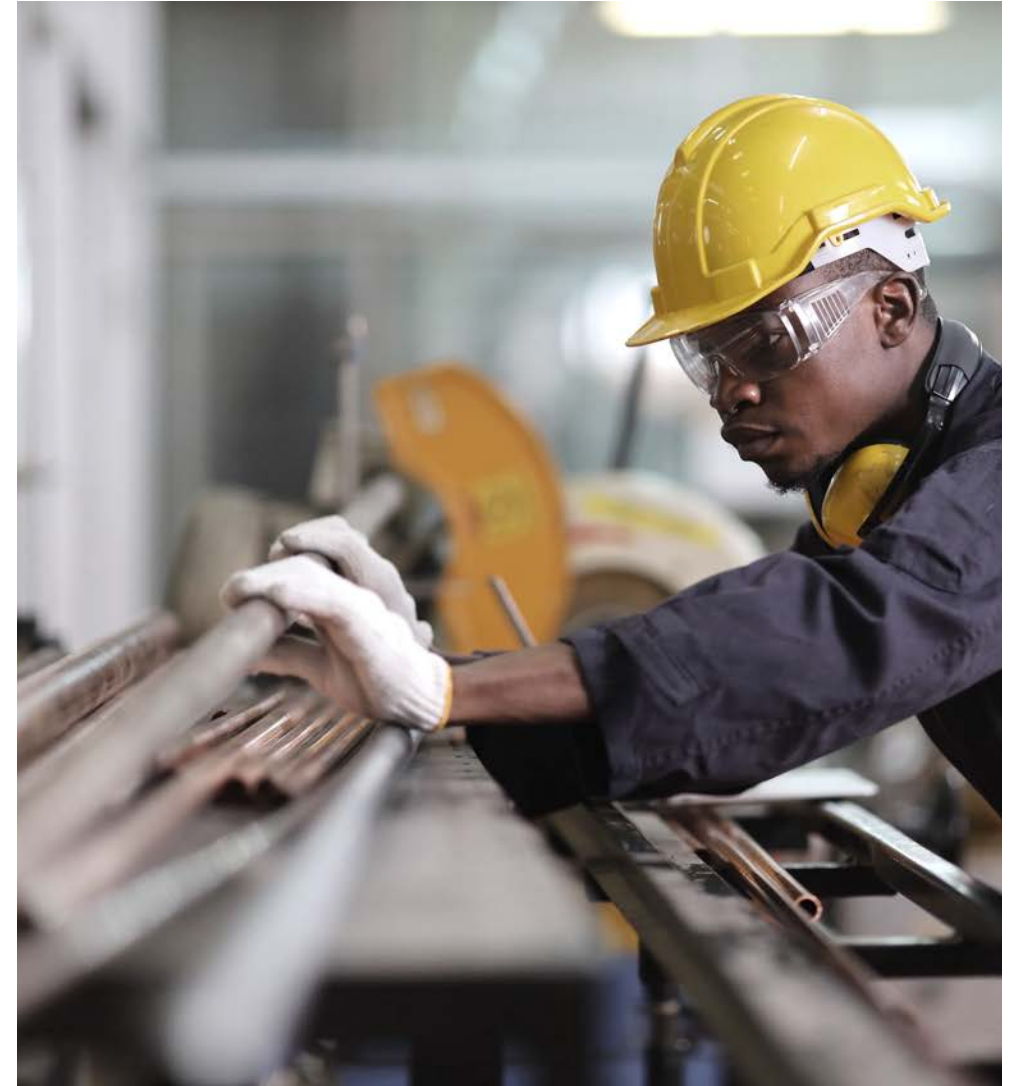
Source: [Freightos Baltic Index \(FBX\)](#), Global Container Freight Index, CBRE Strategic Investment Consulting, April 2022.

# Sky-high lead times for many critical materials

**The global supply chain remains fragile, adding complexity and uncertainty to construction projects.**

Supply chain issues are being exacerbated by steep rises in energy costs, which impact logistics dynamics, and increasing construction activity, which drives up competition for scarce materials.

Lead times may vary on a regional and project basis, but Figure 15 provides a snapshot of typical conditions for several key construction materials currently facing availability issues. These estimates represent aggregations from multiple active general contractor firms as of April-May 2022.



**FIGURE 15:** Typical lead times for key materials**+40 weeks**

Roofing insulation

Lead times for roofing insulation (along with other roofing materials), are currently among the longest in the entire construction industry.

**+36 weeks**

HVAC equipment

Lockdowns in China have significantly reduced manufacturing output for HVAC equipment, while hot weather continues to boost demand. Semiconductor shortages are also contributing to delays.

**+18 weeks**

Wood doors &amp; frames

Shutdowns and strained labor pools in manufacturing and shipping have led to a major backlog in the supply of wood doors, as well as hardware and hollow metal door frames.

Material	Current lead time	Two-year change
Paint	2-3 weeks	+200%
Steel beams & decking	10-14 weeks	+75%
<b>Drywall &amp; metal studs</b>	<b>14-16 weeks</b>	<b>+600%</b>
Lighting & controls	14-20 weeks	+100%
Wood doors & frames	18-20 weeks	+233%
Open web joists	18-30 weeks	+125%
Aluminum storefront glazing	16-32 weeks	+300%
Appliances	20-30 weeks	+400%
Electrical panels	30-40 weeks	+433%
<b>Roofing membranes</b>	<b>35-45 weeks</b>	<b>+800%</b>
HVAC equipment	36-50 weeks	+250%
<b>Roofing insulation</b>	<b>40-50 weeks</b>	<b>+667%</b>

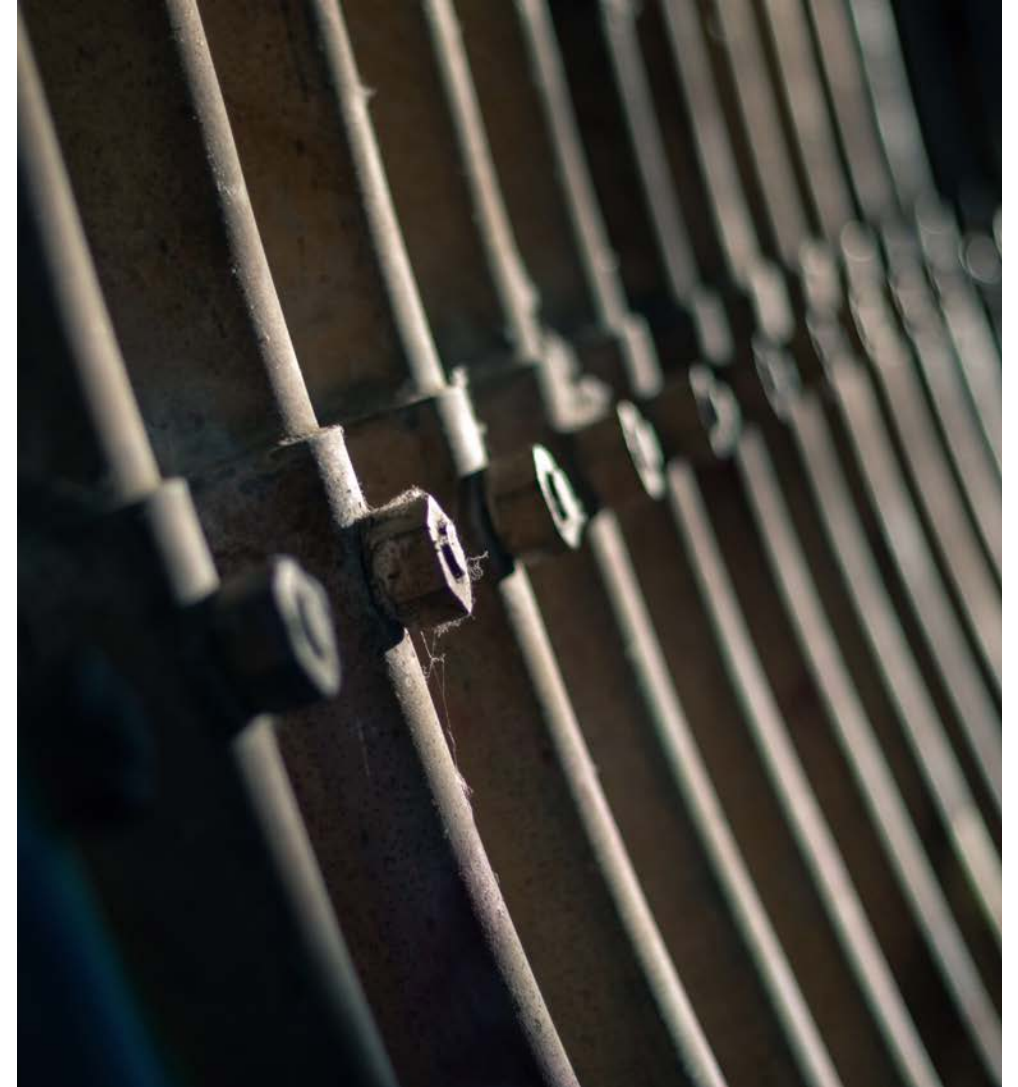
Note: Lead times reflect aggregated information from multiple major general contracting firms and are current as of April-May 2022.

Source: CBRE Econometric Advisors, CBRE Strategic Investment Consulting, April 2022.

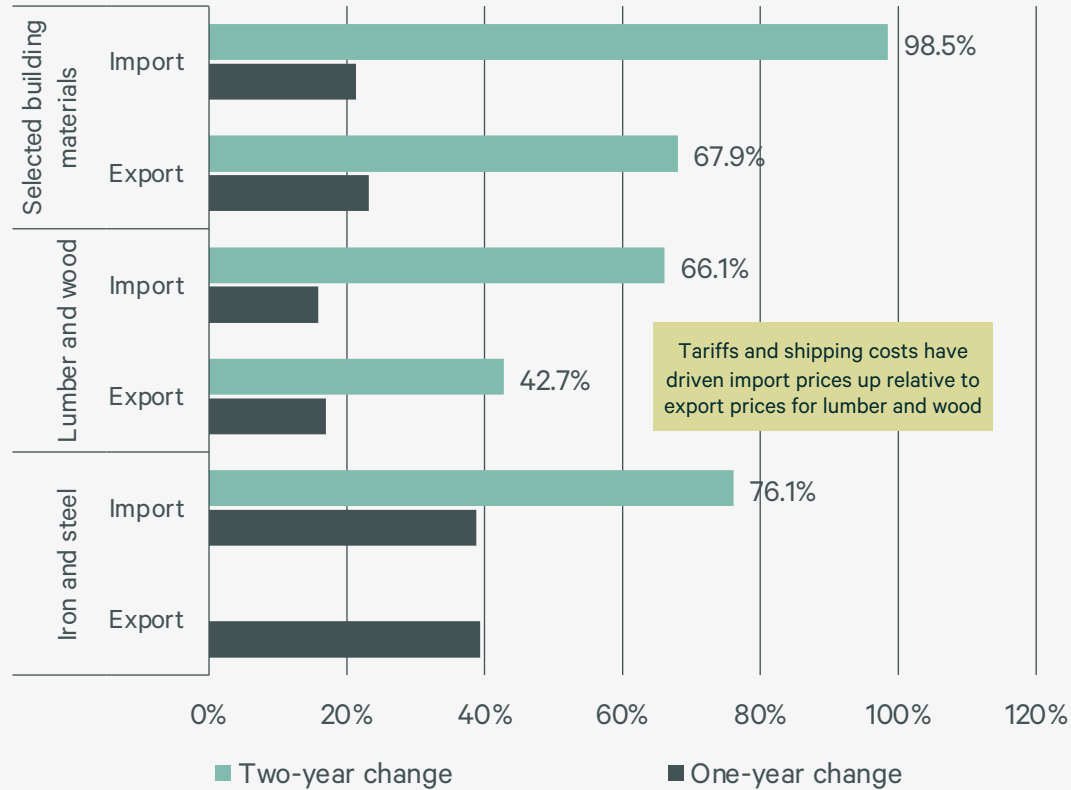
# Tariffs, supply chain issues put additional pressure on imported materials prices

**Import prices are rising much faster than export prices for building materials, with imported building materials more than twice as expensive as exported materials in late 2021.**

Import costs will also be affected by recent U.S. tariffs on Canadian softwood lumber. These administrative changes, alongside continued growth in residential construction volume, could cause contractors to face higher prices.



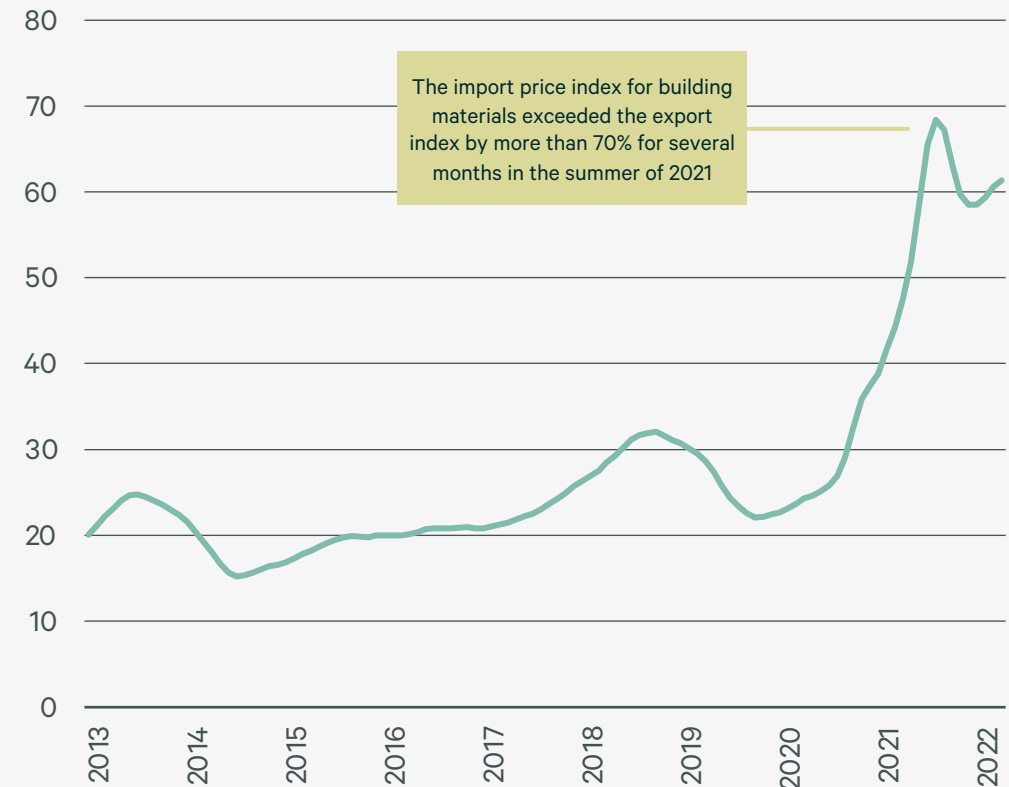
**FIGURE 16:** Producer Price Index growth through March 2022, key construction commodities



Note: Selected building materials include lumber and wood, construction glass materials, and non-wood or glass materials such as stone. Iron and steel PPI export data unavailable prior to December 2020.

Source: U.S. Bureau of Labor Statistics, CBRE Strategic Investment Consulting, April 2022.

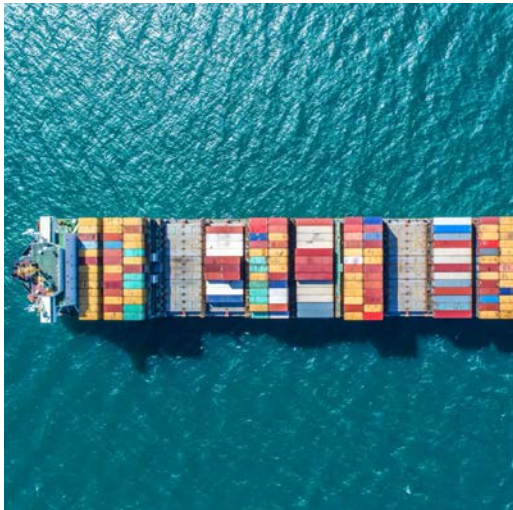
**FIGURE 17:** Spread between import and export price indices, select building materials



Note: Data is trailing 12-month average. Latest data as of March 2022. Spread calculated as the import PPI value minus the export PPI value for the “select building materials” commodity grouping.

Source: U.S. Bureau of Labor Statistics, CBRE Strategic Investment Consulting, April 2022.

# Global events compounding supply chain disruption



## Tariffs on Canadian and EU imports and exports

The U.S. Commerce Department increased tariffs on Canadian softwood lumber from 8.99% to 17.99% in November 2021, but temporarily dropped them to about 12% in early February 2022 as negotiations continue.

The U.S. government removed previously implemented tariffs on aluminum and steel imported from the EU in late 2021 to help alleviate material spikes seen earlier in the pandemic.

In February 2022, the U.S. and Japan changed the 25% tariff on steel to a tariff-rate quota, which means higher duties will be paid on steel after imports reach a specified threshold. The deal will make up to 1.25 million metric tons of steel duty-free.

A U.S. Chamber of Commerce survey of construction contractors in Q4 2021 revealed that nearly half of contractors foresee steel and aluminum tariffs, as well as any new material and equipment tariffs, having a high to very high impact on their business in the next three years.

## War in Ukraine

While the direct impact of the war in Ukraine is still emerging, its effect on shipping costs and petroleum-based products will most likely continue to be felt in the coming months.

Sanctions on Russia have disrupted markets for several key commodities. Nickel prices were four times higher in March 2022 than they were at the beginning of the year, as Russia produces 17% of the global high-purity nickel supply. This is also impacting stainless steel products, as more than two-thirds of global nickel production is used to produce stainless steel.

Russia is also a major producer of palladium (40% of the entire market last year), which is used in semiconductor production. Ukraine currently supplies the U.S. with 90% of the semiconductor-grade neon gas it uses in chipmaking.

## Ongoing COVID-19 concerns and restrictions

While federal, state and local governments have lifted most of the COVID-19 restrictions that hindered construction and supply chains, the industry continues to grapple with ongoing policies, particularly outside the U.S., and the possibility of disruptive new variants and spikes.

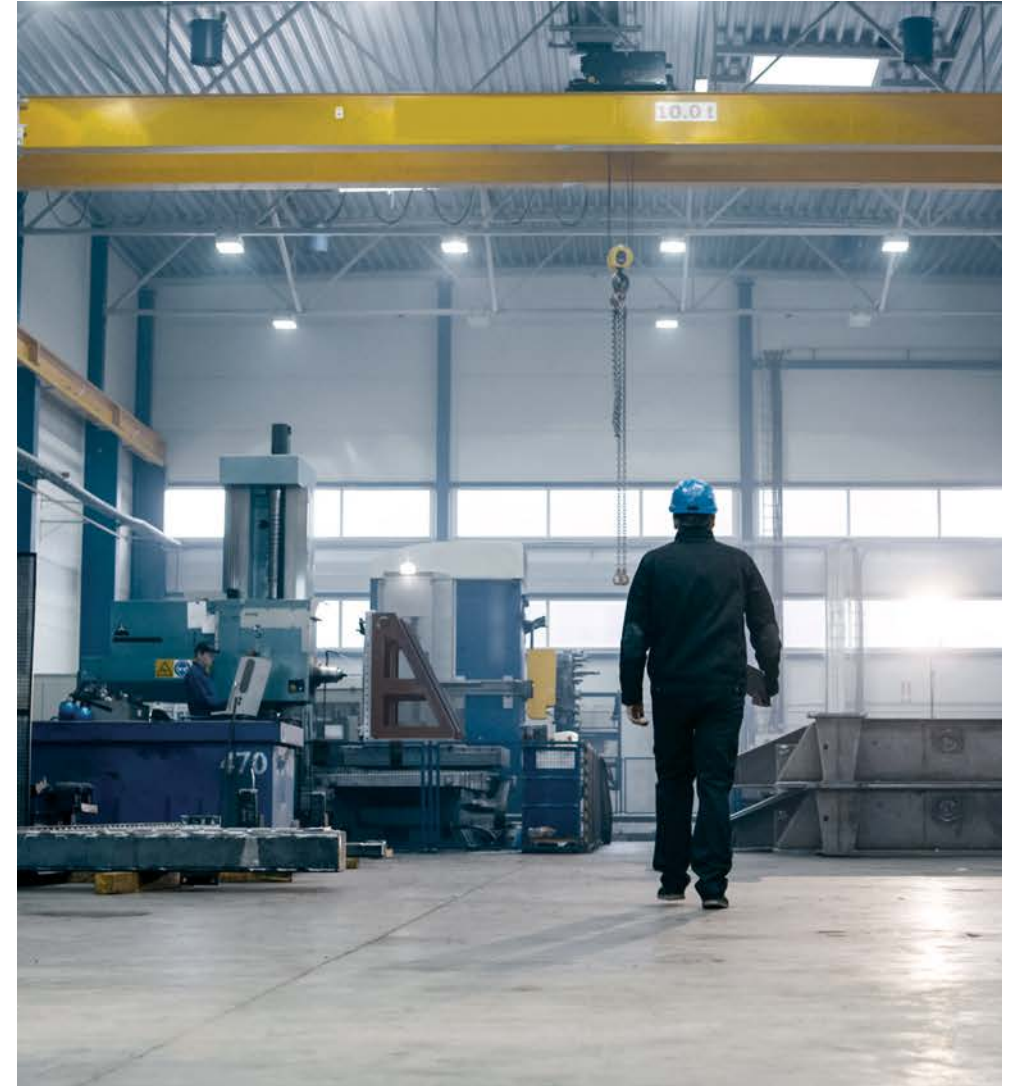
The U.S. Chamber of Commerce survey showed that two-thirds of contractors are experiencing COVID-19-related project delays, most notably due to impacts on the supply chain and worker shortages. This largely overlapped with the spike in cases from the omicron variant, which has been spreading more slowly as of May 2022.

# Energy prices impacting the building industry significantly

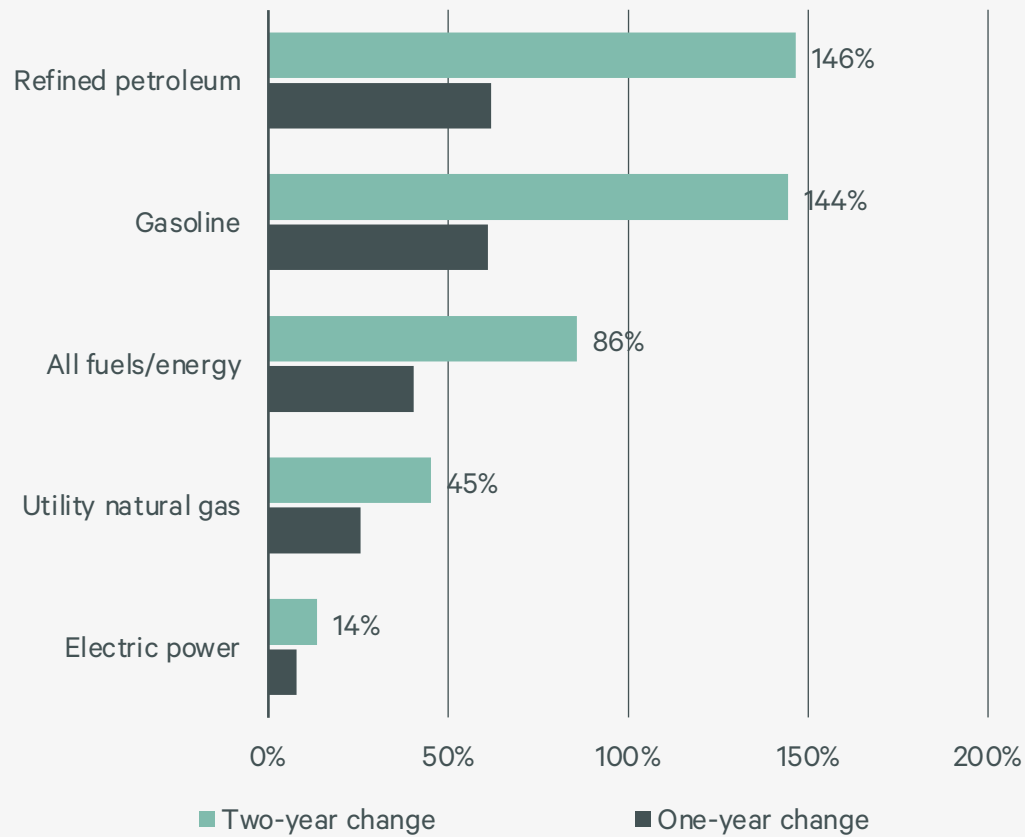
**The rapid inflation year-to-date has been particularly pronounced for energy commodities.**

Prices for refined petroleum and gasoline have increased dramatically in 2022, adding pressure on the supply chain and driving up the cost of moving and producing materials for construction. With these increases, petroleum-based products such as plastics and asphalt will continue to face challenges to maintain current levels.

Additionally, natural gas is up 57% over a two-year period, impacting the bottom line of many operators and builders. Electric power is up 14% over the past two years and has increased significantly in recent months.

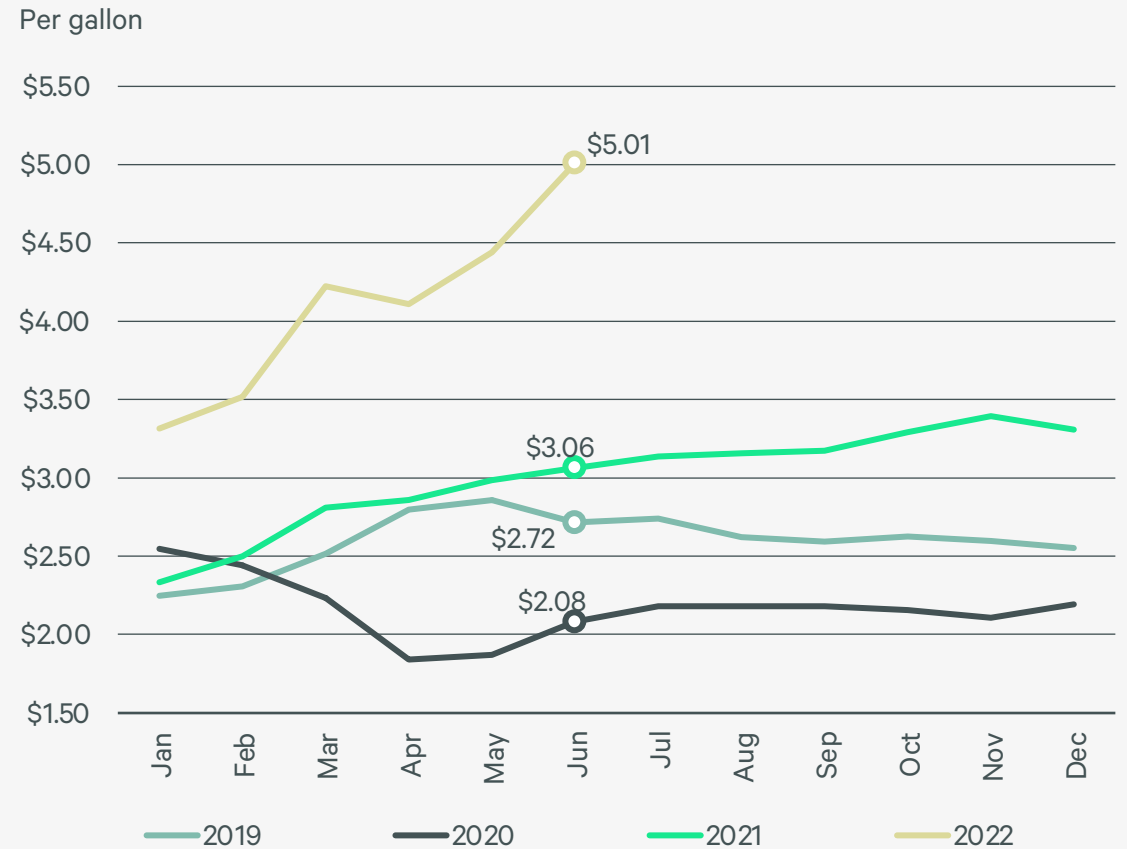


**FIGURE 18:** Producer Price Index growth through March 2022, select energy commodities



Source: U.S. Bureau of Labor Statistics, Producer Price Index, CBRE Strategic Investment Consulting, April 2022.

**FIGURE 19:** U.S. average regular retail gasoline price since pandemic onset



Note: Latest data as of June 13, 2022. For prior years, June data reflects average for the entire month.  
 Source: U.S. Energy Information Administration, CBRE Strategic Investment Consulting, April 2022.

# Supply chain issues impacting critical service providers and material manufacturers

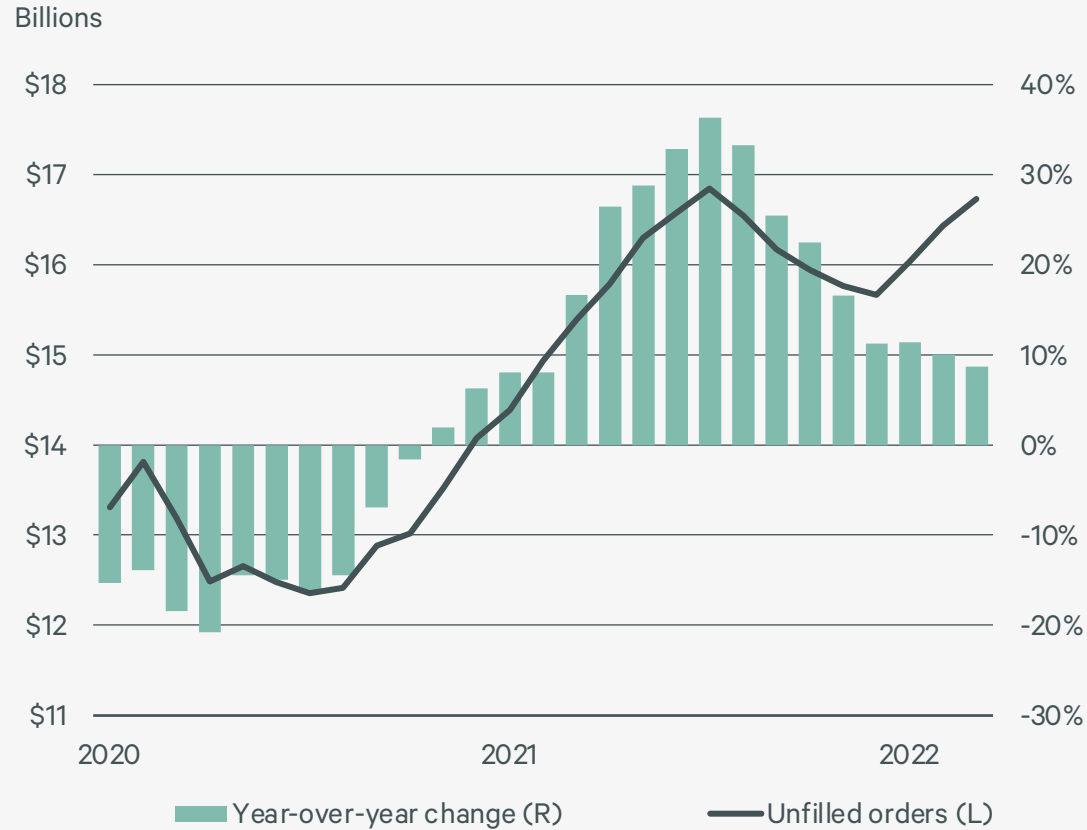
**Manufacturers are having trouble filling orders amid high demand and supply chain challenges, and materials suppliers are raising prices significantly.**

For example, there has been a steep rise in unfilled iron and steel product orders since the onset of the pandemic, with the dollar value of unfilled orders at nearly \$19 billion, as of early 2022.

Building material and supplies dealers have also raised prices as they struggle to obtain adequate supply to keep up with demand.



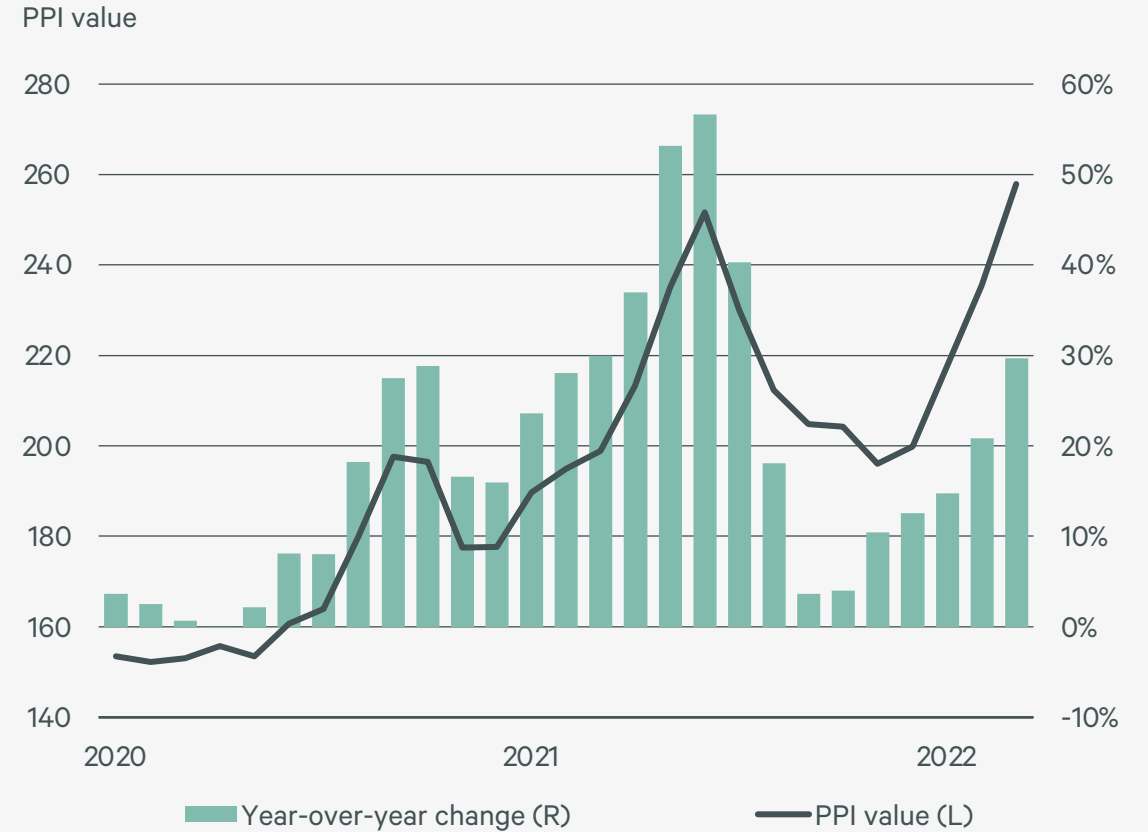
**FIGURE 20:** Manufacturers' unfilled orders, iron & steel mills



Note: Not seasonally adjusted.

Source: U.S. Census Bureau, CBRE Strategic Investment Consulting, April 2022.

**FIGURE 21:** Producer Price Index: building material and supplies dealers



Note: Not seasonally adjusted.

Source: U.S. Bureau of Labor Statistics, CBRE Strategic Investment Consulting, April 2022.

04

# Labor Market Trends

# Construction jobs still below pre-global financial crisis levels

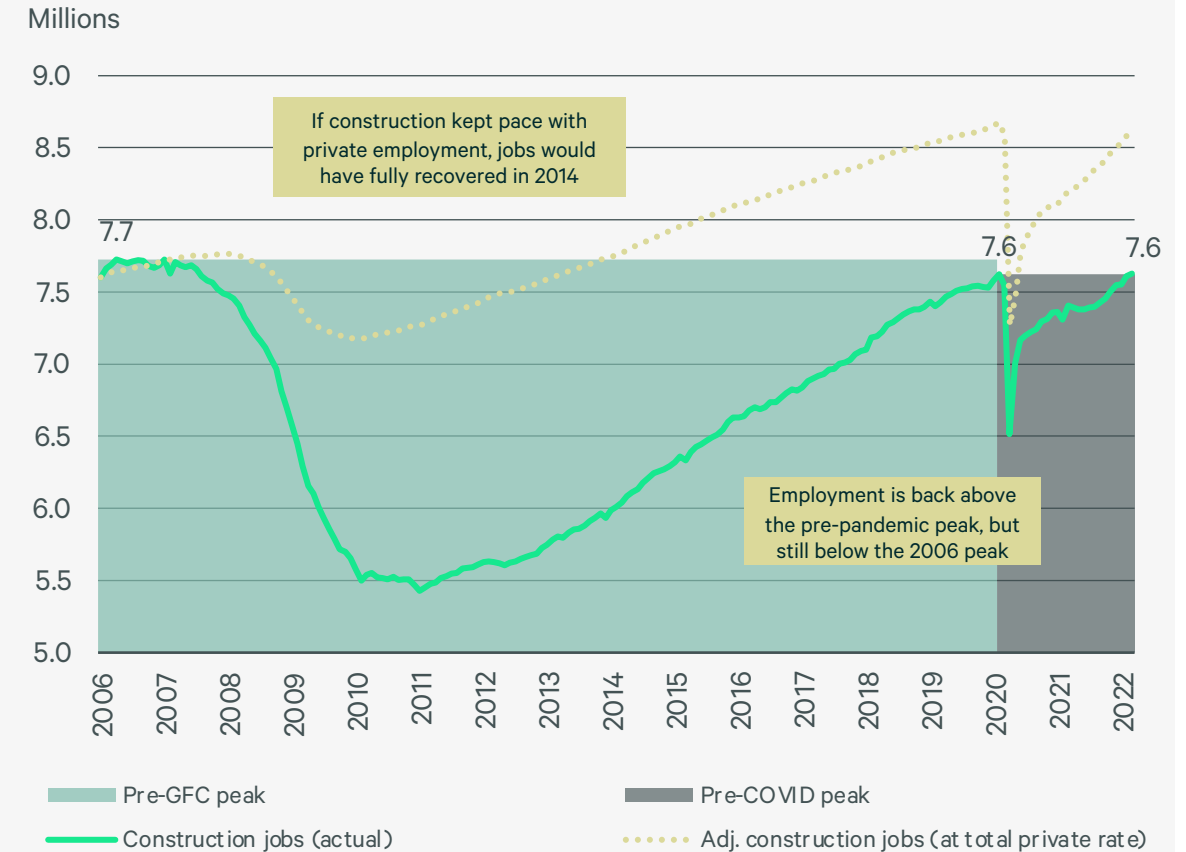
**Modest residential home building in the aftermath of the late 2000s housing market crash prolonged the job recovery for the construction sector and prompted many workers to move into other industries.**

Construction employment peaked at 7.7 million in April 2006, but employment levels tanked when the housing market crashed, reaching a low of 5.4 million in January 2011.

In contrast, after an initial steep decline in employment caused by the pandemic, construction jobs returned quickly, exceeding the February 2020 pre-pandemic peak by 4,000 jobs in March 2022.

Strong demand for residential construction should continue to push up construction employment if employers are able to find appropriate workers in an extremely tight labor market, though many have trouble doing so. A recent U.S. Chamber of Commerce study revealed 45% of contractors reported turning down work due to skilled labor shortages.

**FIGURE 22: U.S. historical construction employment**



Note: Latest data as of March 2022. In the chart's dotted line, the private employment growth rate since January 2006 was applied to the construction employment level in January 2006 to show how construction jobs would have grown if the sector mirrored the pace of the overall private sector.

Source: U.S. Bureau of Labor Statistics, CES, CBRE Strategic Investment Consulting, April 2022.

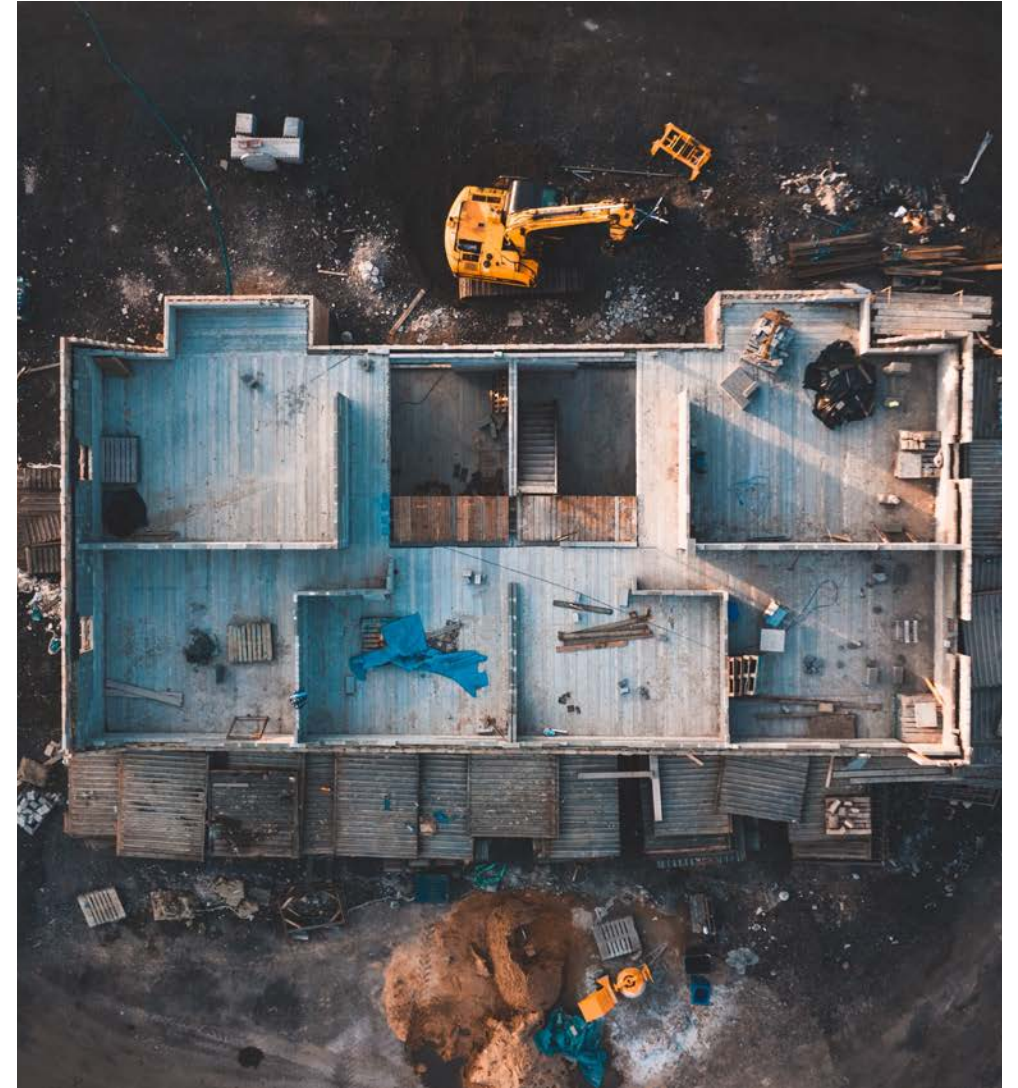
# Construction unemployment remains elevated, but people are returning to the labor force

The unemployment rate for construction workers remains higher than the overall unemployment rate but has come down dramatically and is on pace to return to pre-recession levels.

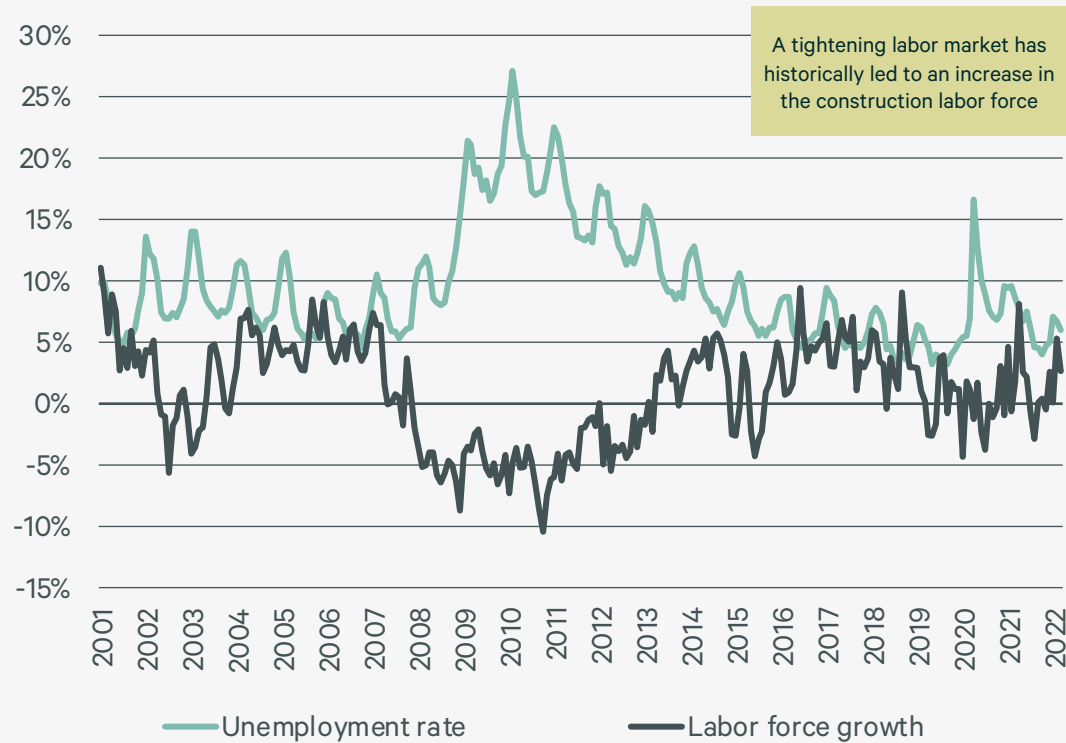
The recent growth of the construction labor force is keeping the unemployment rate elevated since it takes time for job seekers to find the right employer, but labor force growth, combined with declining unemployment, is a healthy sign for a sector that is poised to remain tight in the coming years.

Labor force growth still lags previous periods when the labor market was tightening, and the recent uptick may not be enough to fill construction job openings in 2022.

Construction trade organizations anticipate that wages will continue to grow in 2022 amid a tightening labor market. Bid costs are expected to increase to maintain margins and keep up with wage inflation.



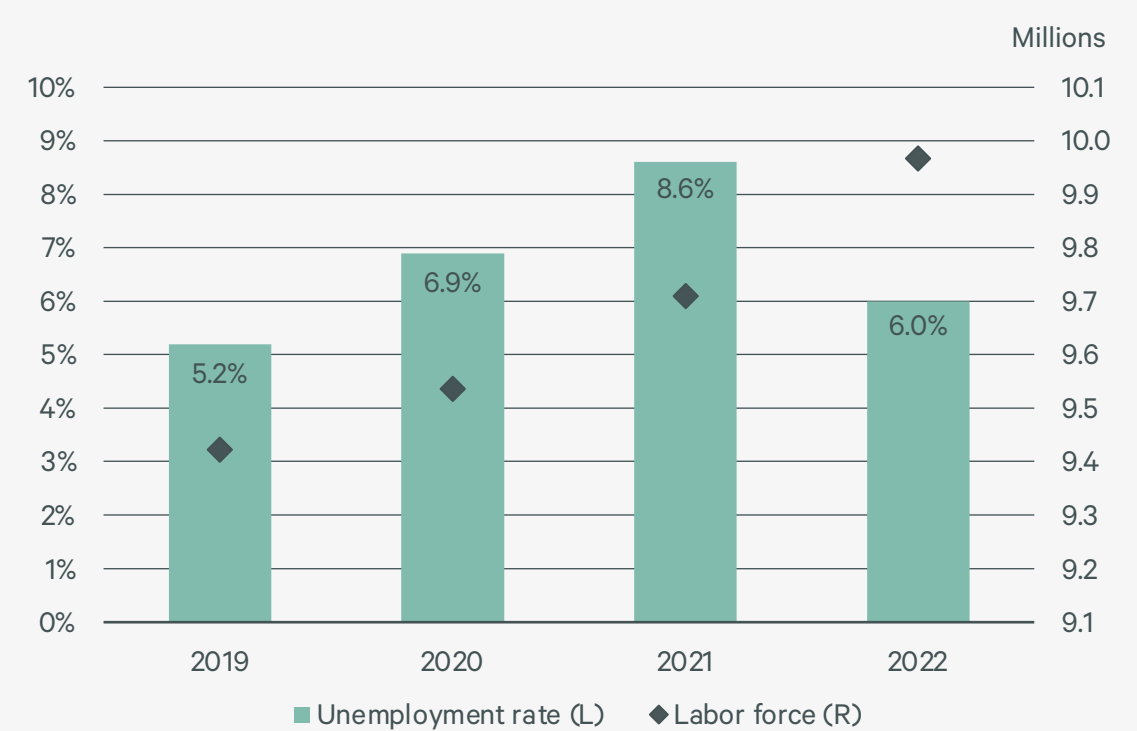
**FIGURE 23:** Historical construction unemployment rate and labor force growth



Note: Latest data as of March 2022, not seasonally adjusted. Construction employment indicators fluctuate month to month due to significant seasonal effects.

Source: Bureau of Labor Statistics, CBRE Strategic Investment Consulting, April 2022.

**FIGURE 24:** March construction unemployment rate and labor force size



Note: Construction employment indicators fluctuate month to month due to significant seasonal effects. Because seasonally adjusted data is unavailable for these indicators, Figure 24 shows only the most recent month for each year historically.

Source: Bureau of Labor Statistics, CBRE Strategic Investment Consulting, April 2022.

# Job openings accelerating faster than companies can hire

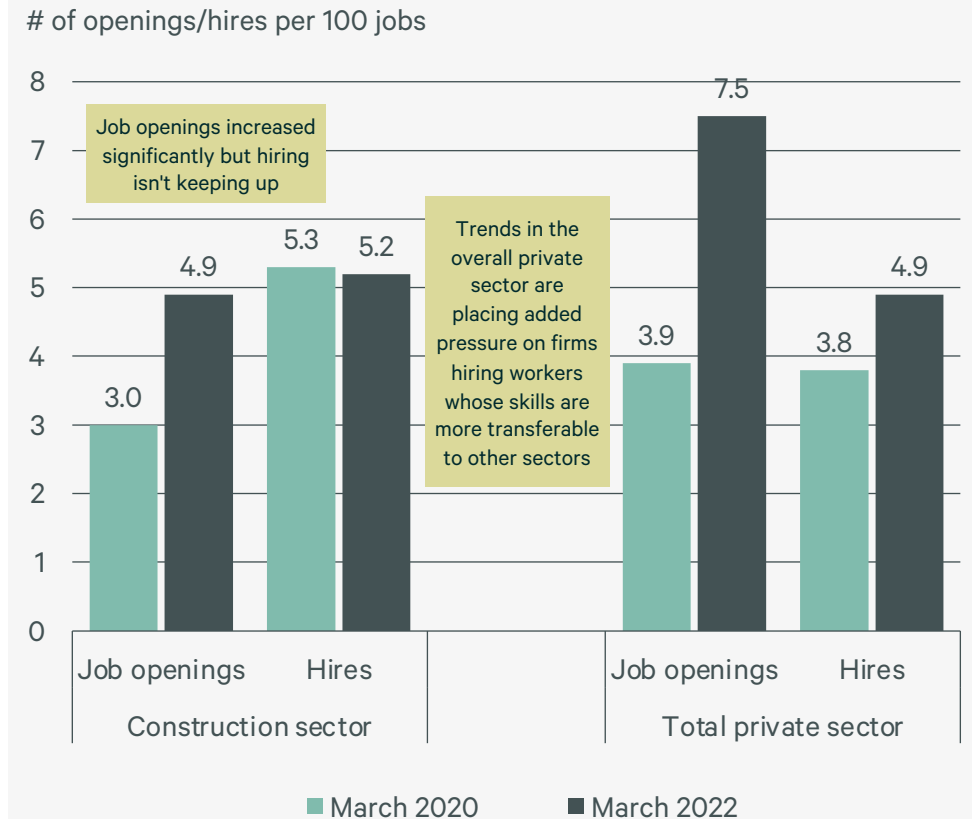
## The labor shortage is impacting most sectors of the economy, including construction.

The construction job opening rate (monthly openings as a share of employment) jumped nearly two percentage points from March 2020 to March 2022. Though demand for labor increased, the hiring rate (monthly hires as a share of employment) declined slightly, indicating employers are finding it difficult to fill positions. Construction typically has a high turnover rate, meaning companies need to hire at a higher rate than most private businesses, and typically that number increases when job openings are up.

This trend is pervasive throughout the economy, particularly in the private sector, though hiring has improved slightly. The extremely tight private sector in 2022 will make construction hiring more challenging, especially for positions with low barriers to entry where construction companies compete fiercely with employers from other private sectors.

As of March 2022, there were 396,000 construction job openings, an 18% increase from 2021. There were 10.5 million private sector openings, up 37% year-over-year. Openings for both sectors are the highest on record, going back to 2001.

**FIGURE 25:** Job opening and hiring rates, construction sector vs. total private employment



Note: Job opening and hiring rates are calculated by dividing the number of job openings (or hires) by the sum of employment plus job openings (or hires) then multiplying by 100.

Source: Bureau of Labor Statistics, Job Openings and Labor Turnover Survey (JOLTS), April 2022.

# Talent pipeline for construction trades back at historic highs

**Degrees awarded for construction trades fell significantly in the mid-2010s, but climbed back to a record high in 2020.**

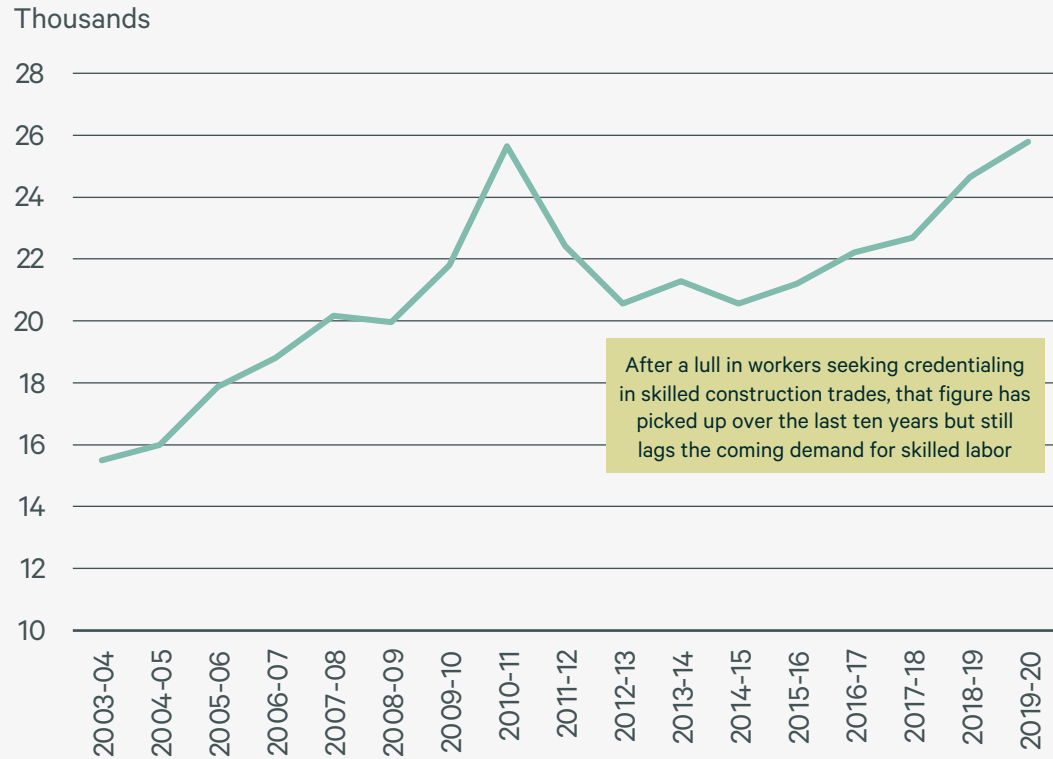
This is especially important as the sector's workforce ages. In 2006, just prior to the Great Recession, workers under the age of 25 made up a larger share of the construction workforce than workers 55 and older. As of 2021, those figures have flipped, with workers 55-and-up now accounting for about one in five construction workers, nearly double the share of those under 25 years old.

Proactive education and recruitment efforts championed by industry groups, alongside the relatively high pay for skilled trade construction jobs, are helping attract younger workers to the degree and certificate programs in the field. This will be critical in relieving some hiring pressure but will need to accelerate to fully offset the large share of the existing workforce nearing retirement age.

In a recent U.S. Chamber of Commerce survey, 91% of contractors reported moderate to high levels of difficulty finding skilled workers, and almost all expect it to stay the same or get worse in the next six months, underscoring the importance of training skilled professionals.



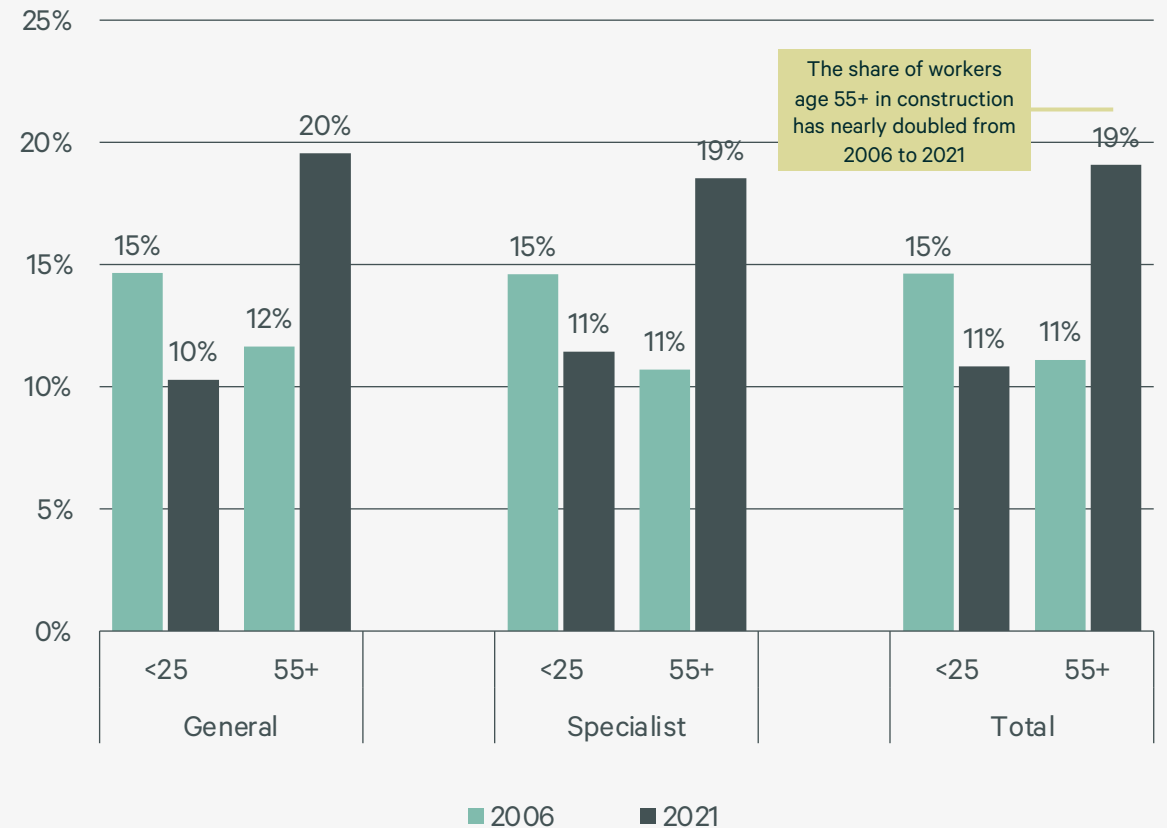
**FIGURE 26:** Degrees and certificates awarded for construction trades



Note: This table presents data collected from Title IV institutions in the United States. Prior to 2009-10, the data include only Title IV primarily postsecondary institutions.

Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Completions component final data (2001-02 - 2018-19) and provisional data (2019-20).

**FIGURE 27:** Share of construction workforce by age group, 2006 vs. 2021



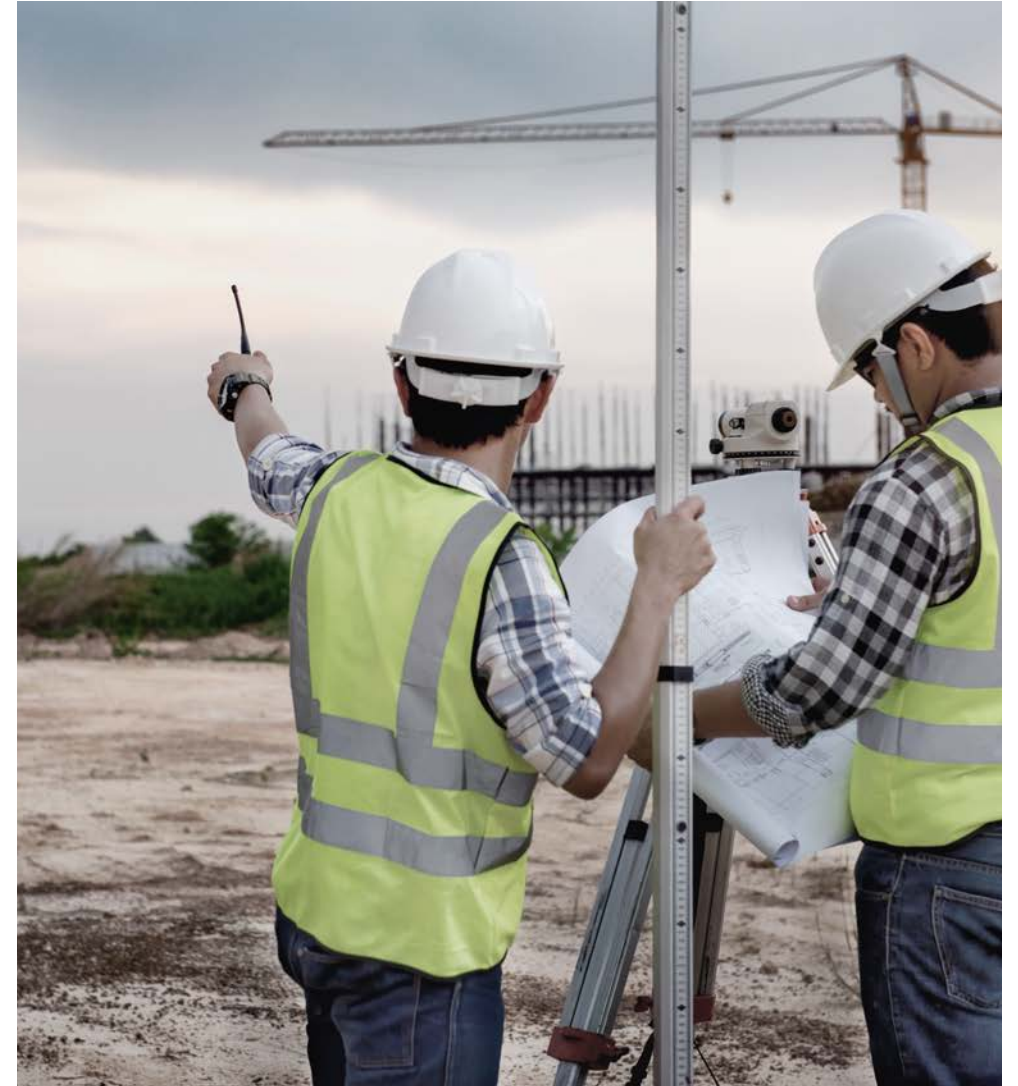
Source: U.S Census Bureau, IPUMS, CBRE Strategic Investment Consulting, April 2022.

## Slow international immigration straining labor pool

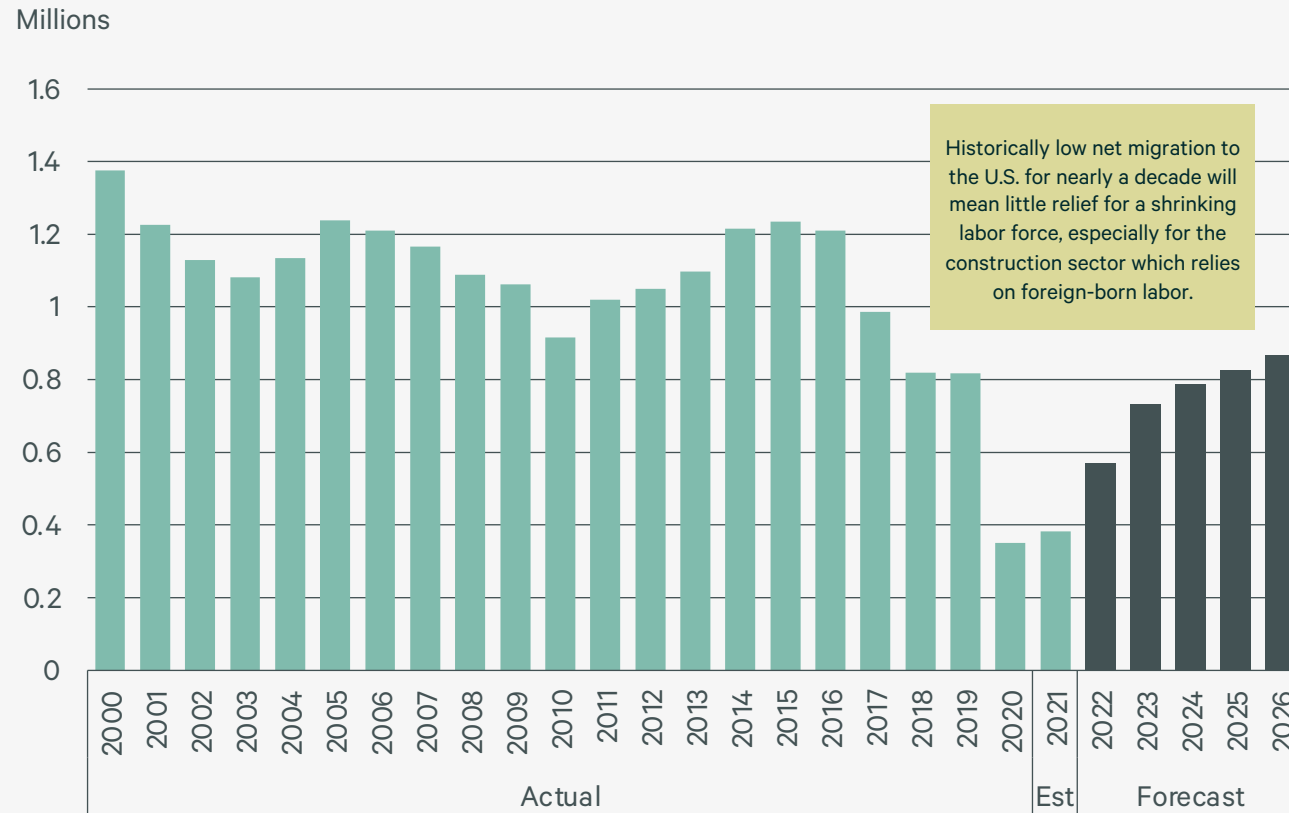
**The construction sector has historically relied on foreign-born labor, with immigrants accounting for three out of 10 construction workers.**

With labor force participation falling across the U.S. even prior to the pandemic, immigration is increasingly critical to fill the labor gap, especially for low barrier-to-entry occupations within construction. However, U.S. net migration began falling in 2017 due to federal policy changes and hit a record low in 2020 due to pandemic conditions.

According to Oxford Economics, immigration is expected to remain well below the levels of the previous 30 years until the latter half of the 2020s. This will put an increasing strain on employers who are already struggling to find enough employees amid a tight and shrinking labor pool.

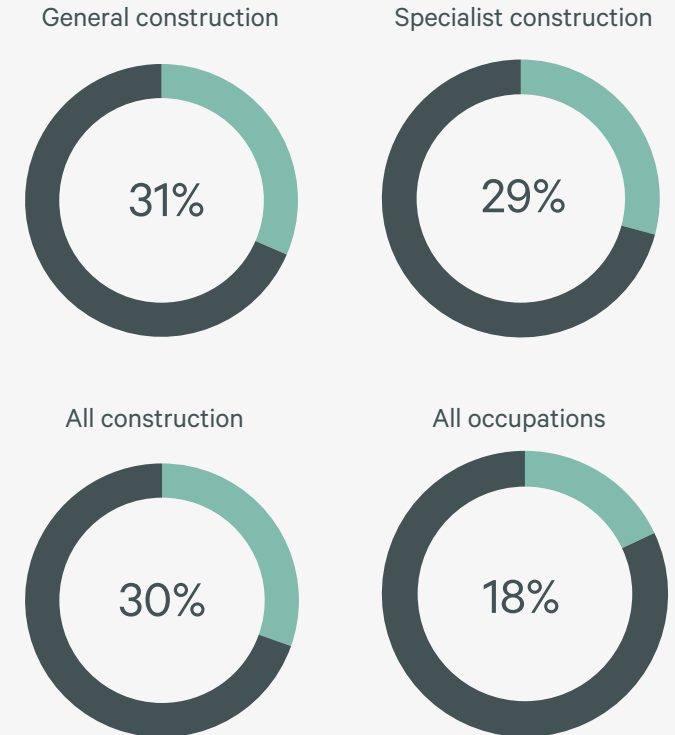


**FIGURE 28:** Net migration to the U.S.



Source: Oxford Economics derived from U.S. Census Bureau data, April 2022.

**FIGURE 29:** Share of foreign-born workers by occupation, 2021



Source: U.S. Census Bureau, IPUMS, CBRE Strategic Investment Consulting, April 2022.

# Construction employment mostly recovered, but wages not keeping up

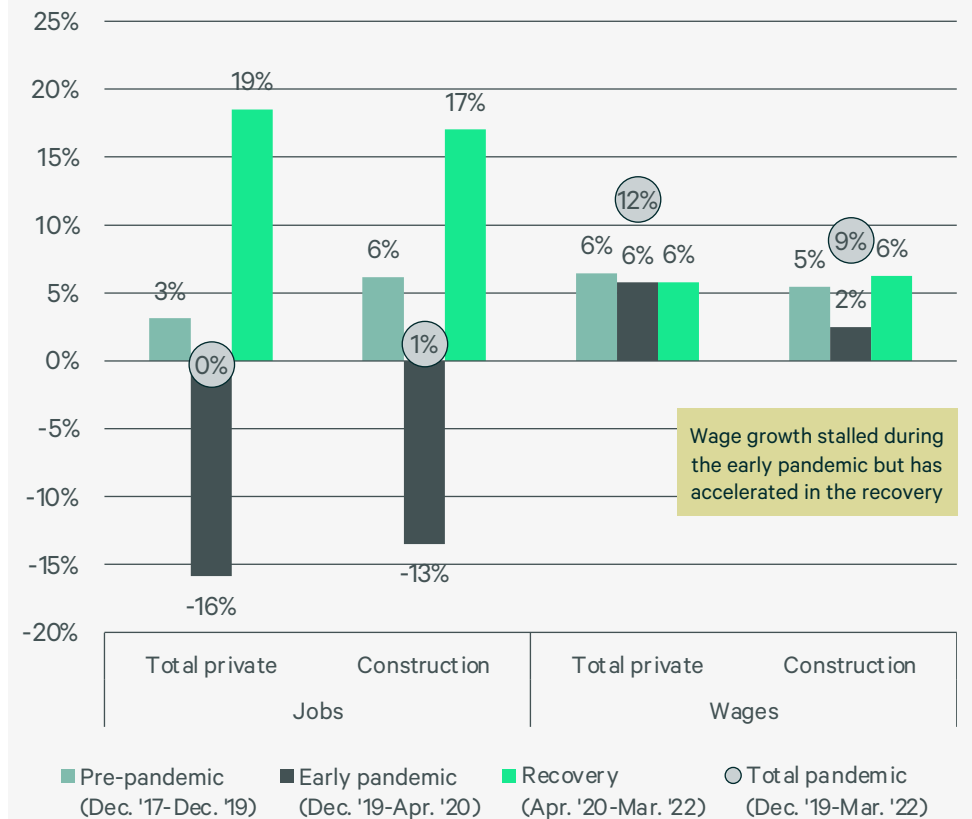
**Construction wage growth is accelerating, which will be important to attract and retain the labor required to fill demand for new construction, but rising inflation is outpacing wage gains.**

During the pandemic construction jobs fell substantially but recovered quickly. The net 1% growth from December 2019 to March 2022 exceeded gains for the overall private sector. However, construction wage growth has lagged overall wage growth during this period, particularly during the early pandemic months. Moreover, construction wages also grew at a slightly slower pace during the two years prior to the pandemic, despite construction employment increasing at twice the pace of the overall private sector during that time.

As of March 2022, year-over-year construction wage growth was 4.4%, lagging both the private sector (5.2%) and the Consumer Price Index (7.9%), which could create challenges for attracting and retaining construction labor, especially for positions that compete for workers with a broad range of sectors.

While the average hourly wage is the primary driver of labor costs, the number of hours worked, especially overtime hours, is also important. As of March 2022, the average weekly hours for nonresidential construction employees reached 41.1, the highest since the Bureau of Labor Statistics began keeping track in 2006, and 18% higher than the overall private sector.

**FIGURE 30:** Construction employment and wage change by period



Source: U.S. Bureau of Labor Statistics, CBRE Strategic Investment Consulting April 2022.

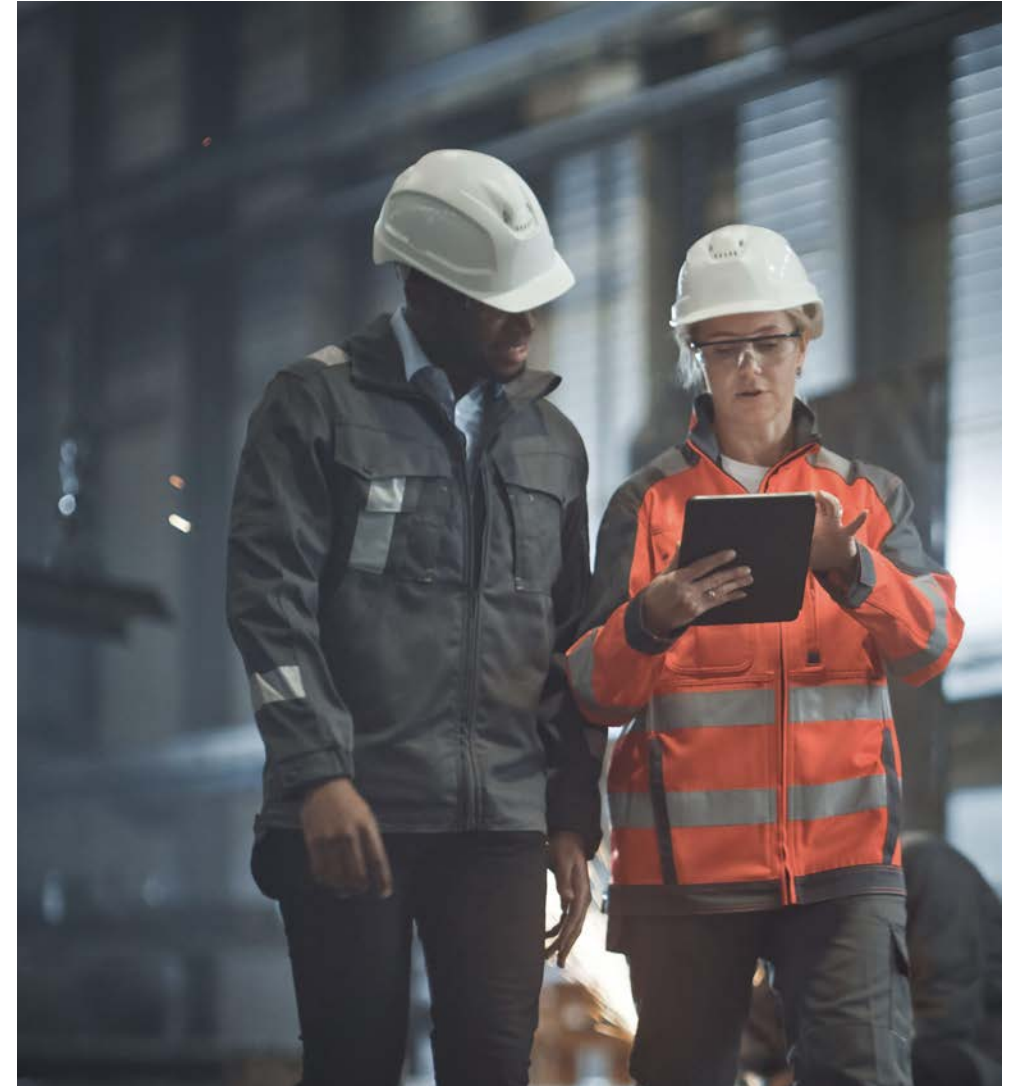
## Union workers receiving higher wages, but membership is declining

**The average hourly wage for a unionized construction worker was 39% higher than a non-union worker in 2021, but the gap is shrinking and membership is declining.**

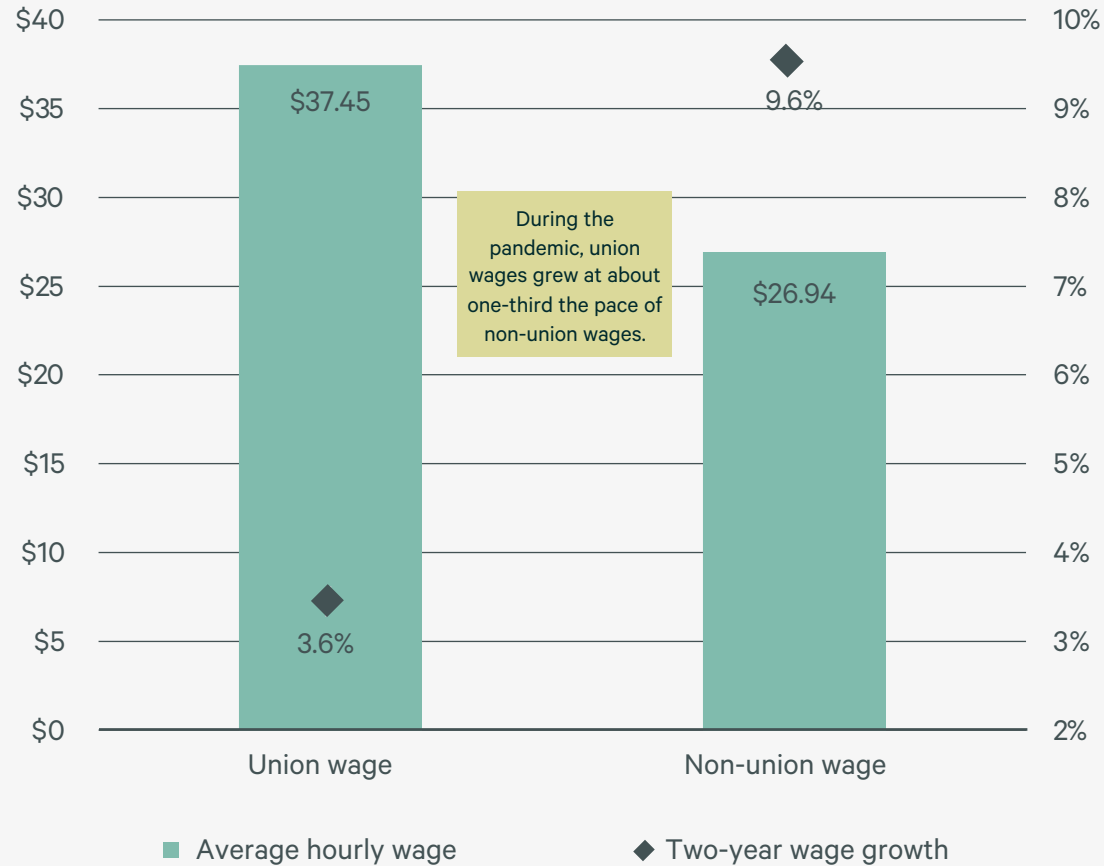
Union membership fell dramatically from 2001 to 2021, though union membership in the construction sector remained higher than the 6.1% private sector average.

The union wage premium has been shrinking steadily since the mid-1980s, when union wages were 69% higher than non-union wages. Union workers even took a 1.2% pay cut in 2020 while non-union wages grew 8.3%. Non-union workers have been the primary drivers of rising construction labor costs during the pandemic recovery, as union wages are much more likely to have been previously negotiated in a multi-year agreement.

Locations and occupations with greater union coverage will likely see higher labor costs due to the union wage premium, but are also likely to see less wage inflation in the near future, making those costs slightly more predictable.

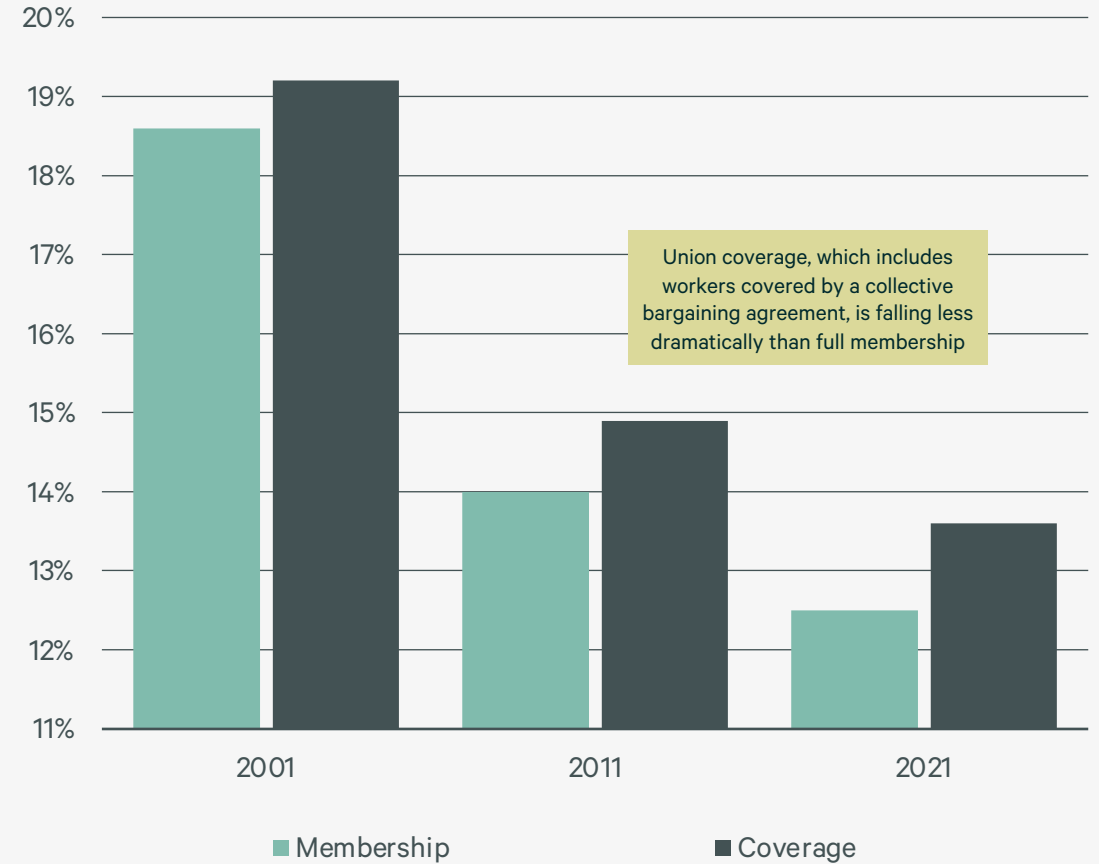


**FIGURE 31:** 2021 construction wages by union affiliation



Source: Bureau of Labor Statistics, Union Stats, CBRE Strategic Investment Consulting April 2022.

**FIGURE 32:** Union membership and coverage, construction sector



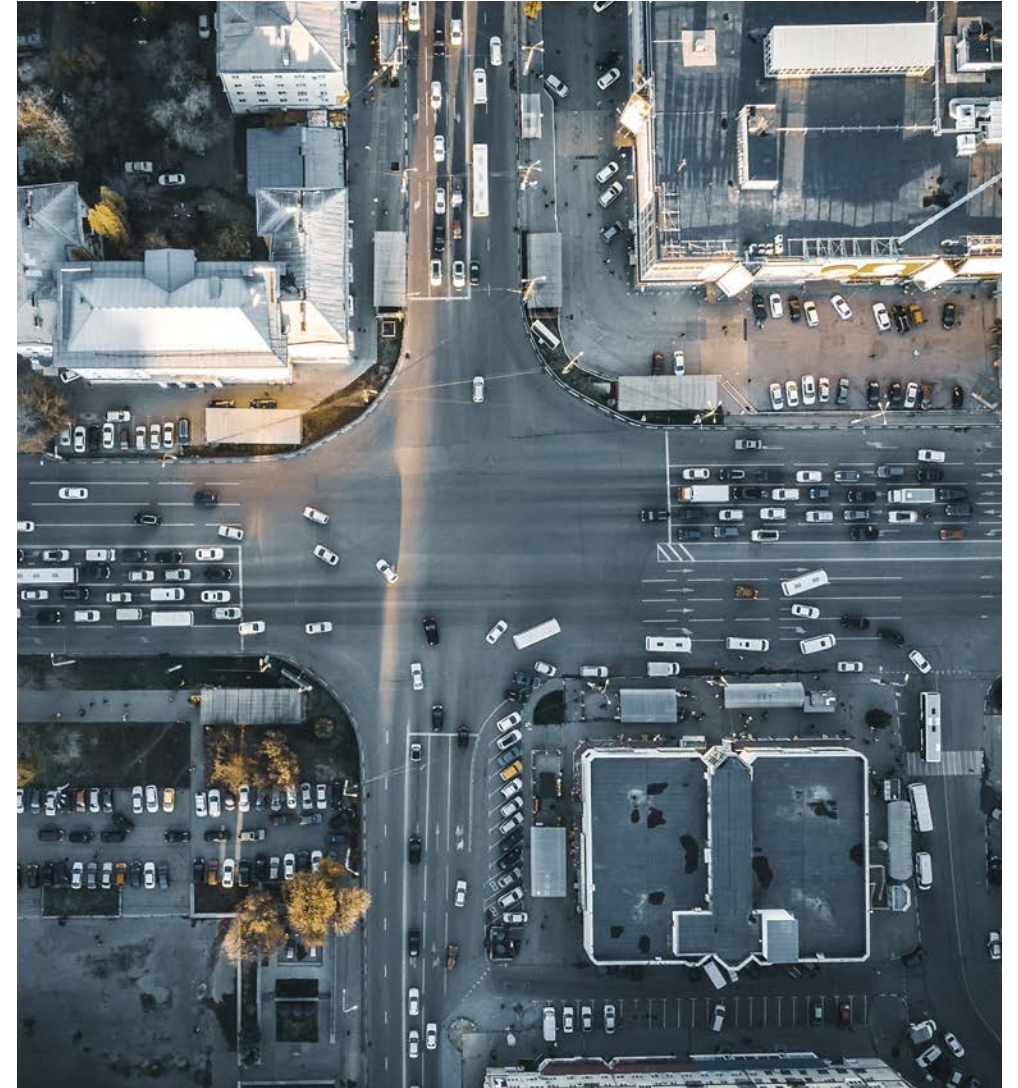
Source: Bureau of Labor Statistics, Union Stats, CBRE Strategic Investment Consulting April 2022.

## Job growth most dramatic in metros with strong wage increases

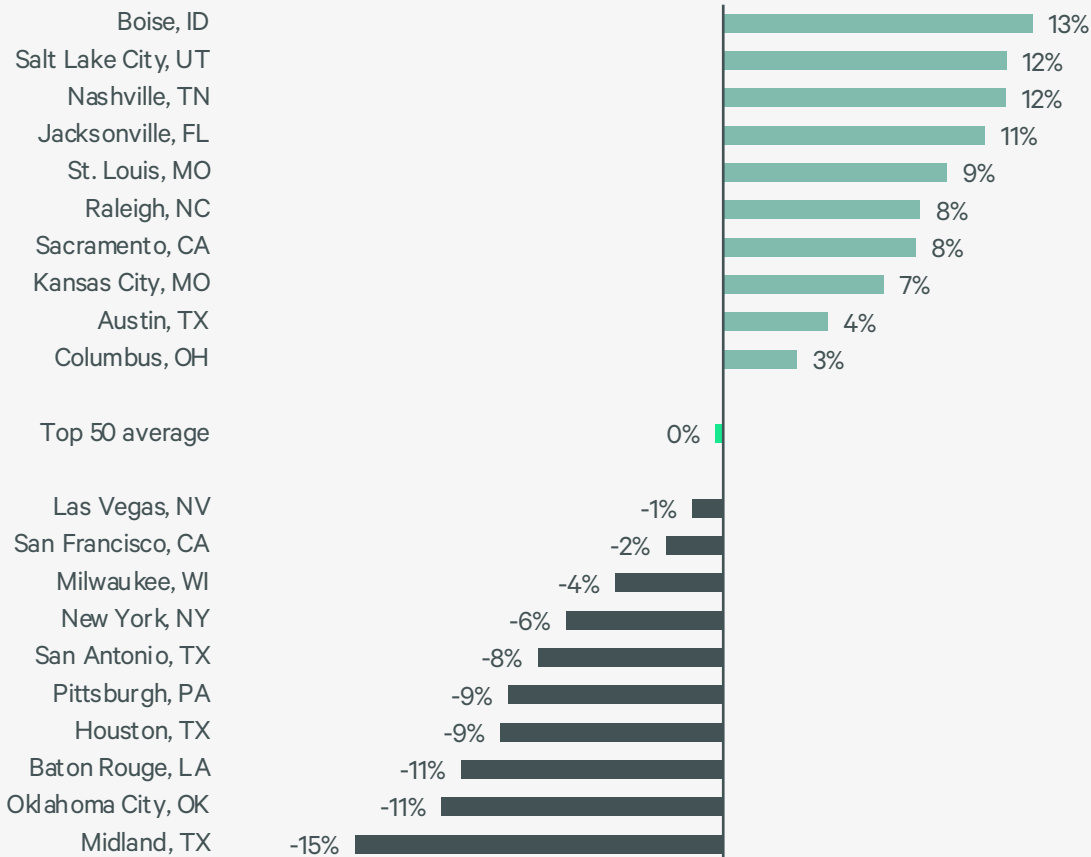
**Wage increases and job growth correlates moderately when comparing major metropolitan areas in the U.S., with growth in both measures most notable in secondary, Sun Belt and Mountain West metro areas.**

Large metros like New York were less likely to see a rebound in job growth, likely due to lower demand for residential construction amid pandemic aftereffects, but some large metros like San Francisco had above average wage growth despite lagging job growth. Metros with strong wage growth but slow job growth could indicate pent up labor demand.

Metros like Austin, Nashville, Boise and Sacramento have seen strong demand for residential construction since the pandemic, which is likely driving both job and wage growth.

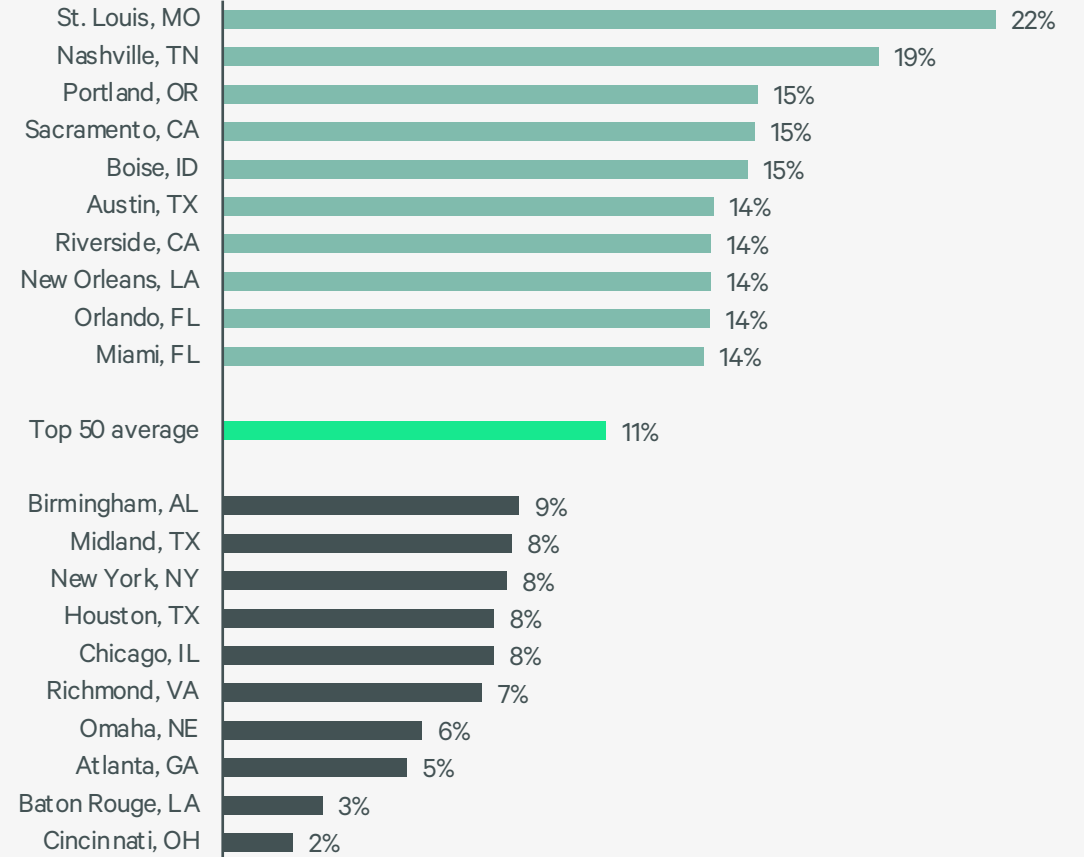


**FIGURE 33:** Change in construction jobs, top and bottom 10 metro areas, March 2020-March 2022



Note: Among top 50 MSAs by number of construction employees as of March 2022.  
 Source: Bureau of Labor Statistics, Oxford Economics, CBRE Strategic Investment Consulting, April 2022.

**FIGURE 34:** Change in construction wages, top and bottom 10 metro areas, Q4 2019-Q4 2021



Note: Among top 50 MSAs by number of construction employees as of March 2022.  
 Source: Bureau of Labor Statistics, Oxford Economics, CBRE Strategic Investment Consulting, April 2022.

05

# Impact on *Materials* Costs

# Construction material prices rose sharply in early 2021, poised to keep increasing in 2022

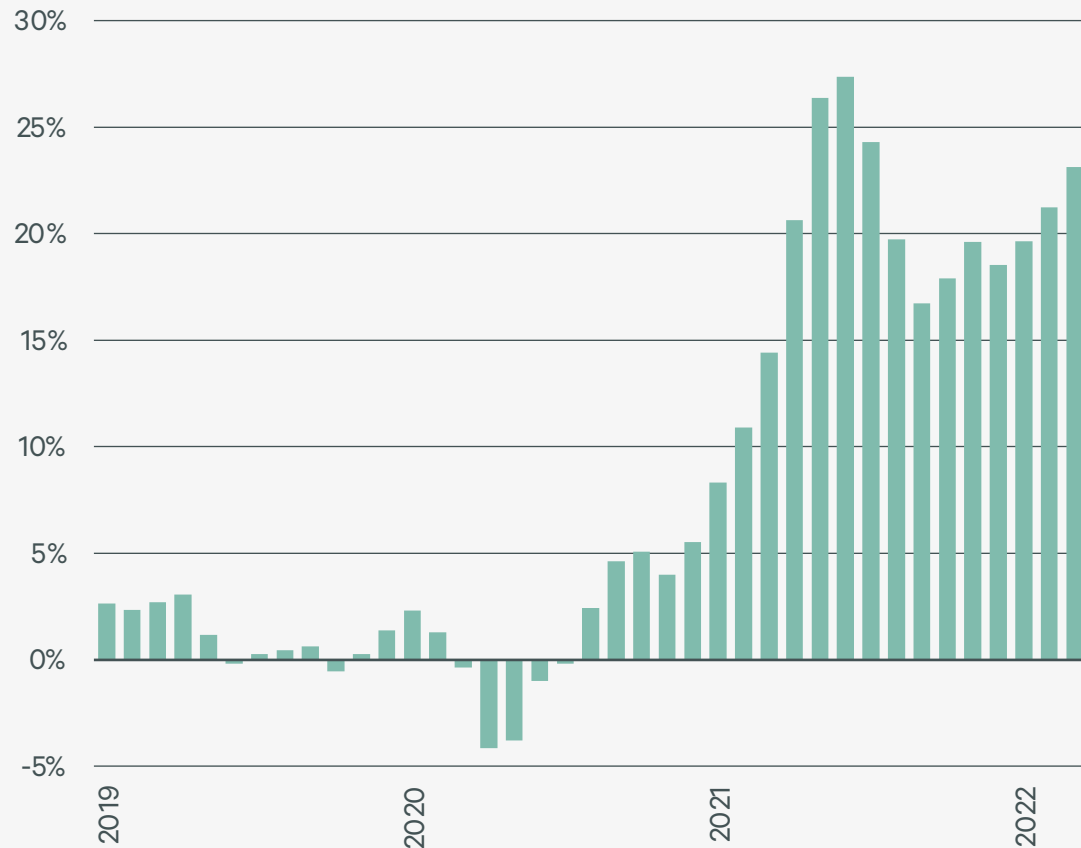
Price growth for goods and services used by construction companies has been above 15% year-over-year since early 2021 and is accelerating in 2022.

Input costs—the price paid for all goods and services, excluding labor and capital investment, used by construction firms—for new nonresidential construction were up 42.5% from March 2020 to March 2022, after falling briefly during the early stages of the pandemic. Construction output, the price charged by construction firms for completed projects, has also risen sharply, but has lagged input prices by about 6-9 months as contractors gradually adapt to new conditions and pass on more of their costs.

Given that input prices are sharply rising again in 2022, output prices for construction services are likely to follow suit and increase throughout the year.

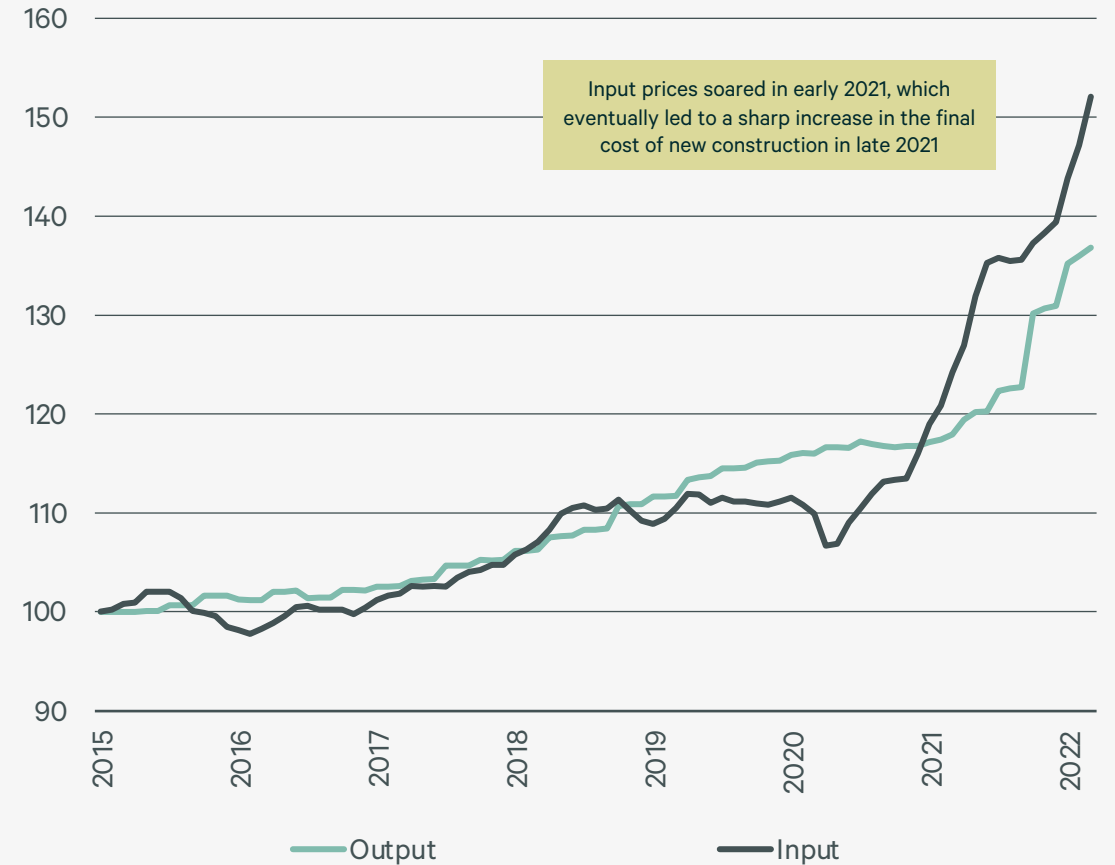


**FIGURE 35:** Producer Price Index: inputs to construction, year-over-year change



Note: Latest data as of March 2022.  
 Source: Bureau of Labor Statistics, Producer Price Index, CBRE Strategic Investment Consulting, April 2022.

**FIGURE 36:** Input vs. Output Price Index, new nonresidential construction



Note: Latest data as of March 2022, Index benchmarked to 100 in Dec. 2015.  
 Source: Bureau of Labor Statistics, Producer Price Index, CBRE Strategic Investment Consulting, April 2022.

# Key inputs like iron, steel and lumber logging major increases

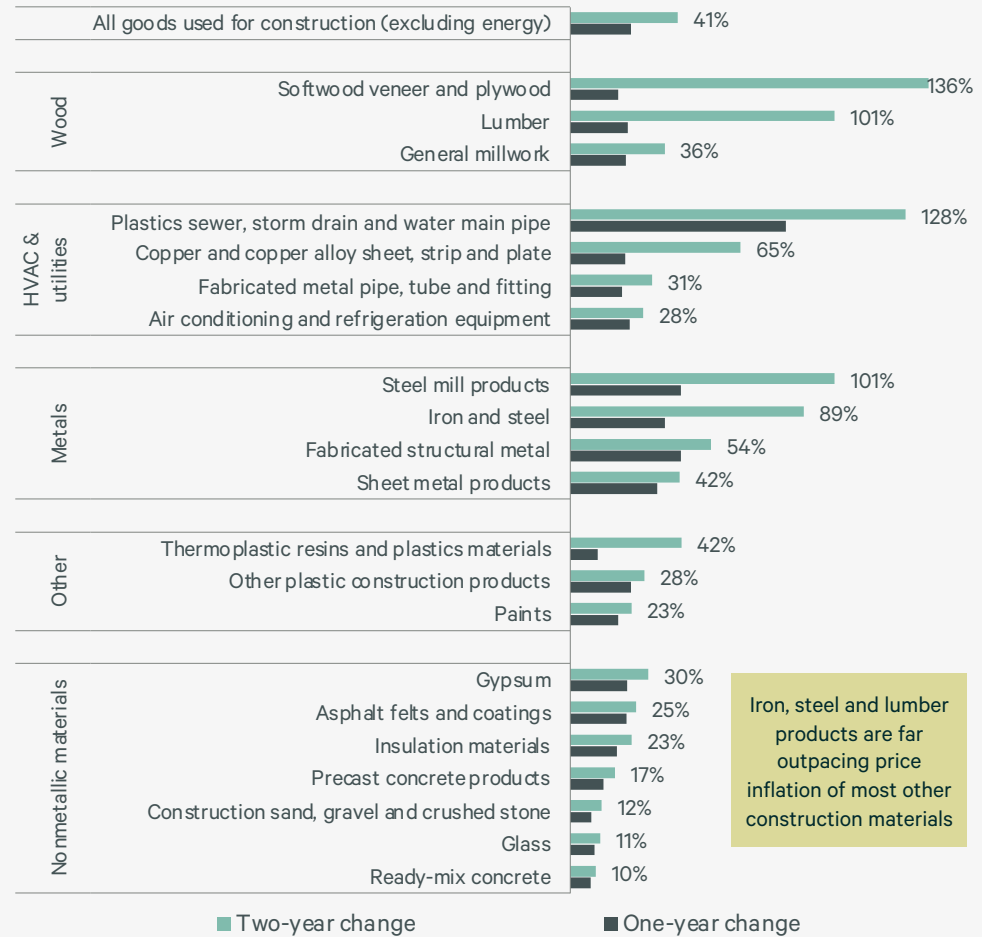
Based on the Producer Price Index (PPI) basket of all goods used in construction (excluding energy), prices were up 41% in March 2022 from March 2020.

The cost of steel mill products, some plastic piping, and softwood veneer and plywood have more than doubled since March 2020. Prices for some materials, like ready-mix concrete, which makes up 10% of the overall goods index, have not risen as dramatically and have kept the figure slightly down, as have other non-metallic and non-wood commodities.

Still, inflation has been abnormally high for essentially all construction materials, since the onset of the pandemic and, for most materials, most of the price change has happened in the past year (lumber and softwood are the major exceptions, with steep price hikes in 2020 as well).

Iron and steel prices have inflated dramatically over the past two years, but prices began to soften in late 2021. Since prices peaked in November 2021, the PPI for iron and steel has fallen 8% through March 2022.

**FIGURE 37:** Price inflation for select construction commodities, March 2020-March 2022



Source: U.S. Bureau of Labor Statistics, CBRE Strategic Investment Consulting April 2022.

Iron, steel and lumber products are far outpacing price inflation of most other construction materials

# Labor, public health, tariffs and demand swings affecting commodity pricing

## Lumber and wood

The boom in residential construction and do-it-yourself renovations through the pandemic pressured lumber suppliers struggling to rebuild sawmill capacity amid rising demand. Coupled with import regulations and tariffs, which remain in flux, as well as transport challenges, this has caused major price spikes and volatility that will likely persist in the near term.

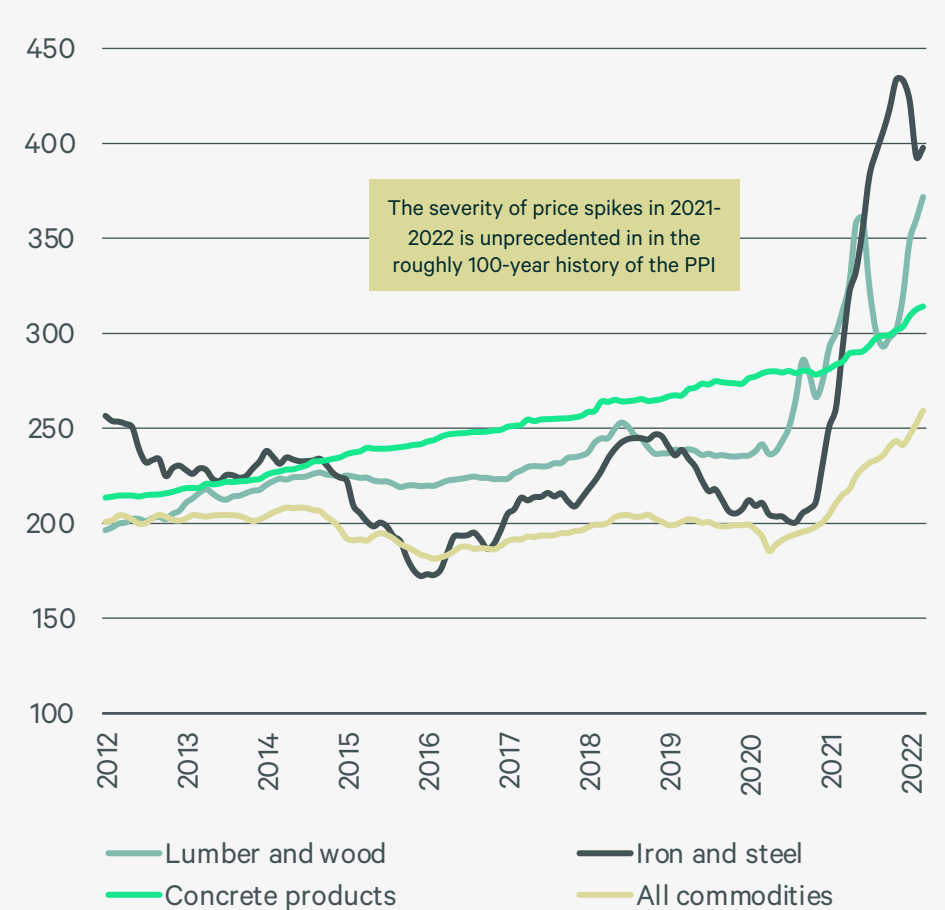
## Iron and steel

The U.S. has softened its tariffs on EU steel to help relieve skyrocketing costs and demand. Delayed shipments and global supply chain issues will continue to drag on the supply side of steel products while U.S. steel factories are unable to fully sustain the current demand.

## Concrete

Concrete prices tend to be steadier than other construction inputs, but even concrete has seen unusually steep inflation since the start of 2021 as long lead times, strained manufacturing and labor shortages drive costs upward. With a new infrastructure bill signed and construction beginning this year, cement and concrete commodities are expected to be in even higher demand moving forward.

**FIGURE 38:** Historical price inflation for major construction commodities



Note: Latest data as of March 2022.  
 Source: U.S. Bureau of Labor Statistics, Producer Price Index, CBRE Strategic Investment Consulting, April 2022.

## Costs for most materials are inflating rapidly, but a few are starting to decline

**Prices for materials have been extremely volatile since the onset of the pandemic, with largely unprecedented rates of inflation in 2021.**

In a Q4 2021 survey from the U.S. Chamber of Commerce, essentially all (97%) contractors reported that material cost fluctuations have had a moderate to high impact on their business. Respondents had the highest concerns about the prices of steel and wood products.

In general, materials prices will likely continue to rise in the near term. Although the pace of inflation is largely easing (as seen for most of the commodities highlighted in Figure 39) and expected to continue to cool, most prices will not reset to pre-pandemic levels. Impacts will vary by material and depend on several factors. For heavily imported goods, like lumber and iron, prices depend on transportation costs (i.e., fuel) and ongoing tariff negotiations, while other materials like stainless steel could see ongoing impacts from the Russia-Ukraine conflict.

**FIGURE 39:** Recent price changes for key construction materials through March 2022

Material	Last 6 months	Last month
Lumber	57%	4%
General millwork	11%	1%
Fabricated structural metal	11%	0%
Machinery and equipment	8%	1%
Sand, gravel and stone	6%	1%
Gypsum	6%	2%
Ready-mix concrete	4%	0%
Thermoplastic resins and plastics materials	-7%	-2%
Iron and steel	-4%	-1%

Source: U.S. Bureau of Labor Statistics, Producer Price Index, April 2022.

06

# Implications for Construction Costs

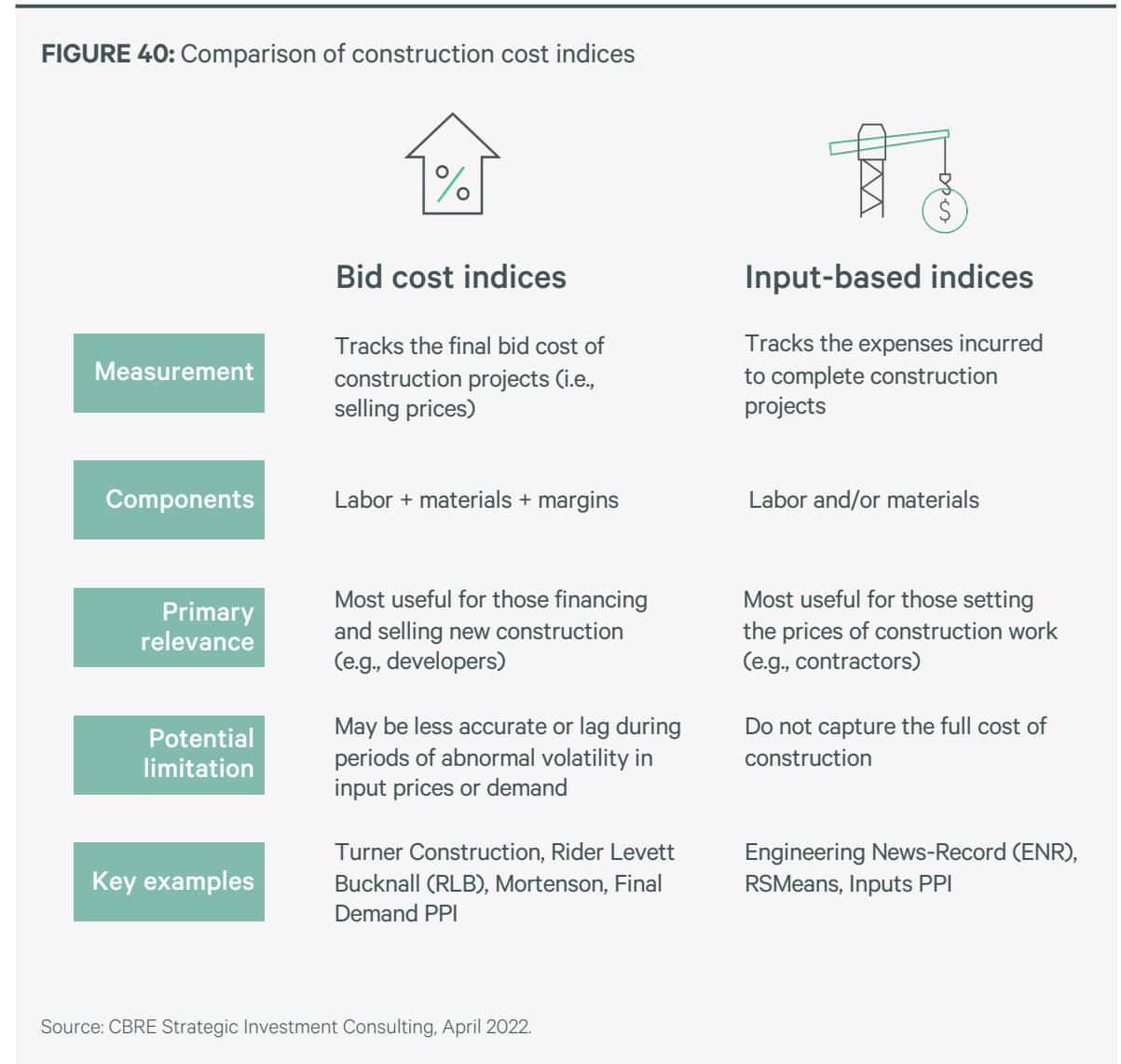
# How should construction costs be measured?

Industry professionals use a variety of construction cost indices to track cost escalation over time, and estimates vary based on what the index is attempting to measure.

Major indices can be grouped into two broad types: those based on bid costs (also referred to as “whole building” or “selling price” indices) and those based on input costs (sometimes referred to as “measures of inflation”).

Both types of indices are useful, depending on the questions and context. The main differentiator between the two types is whether they incorporate some measure of contractor profit margins. For both types, the level of detail and weighting of index components, as well as the number of geographies represented, varies considerably.

**FIGURE 40:** Comparison of construction cost indices



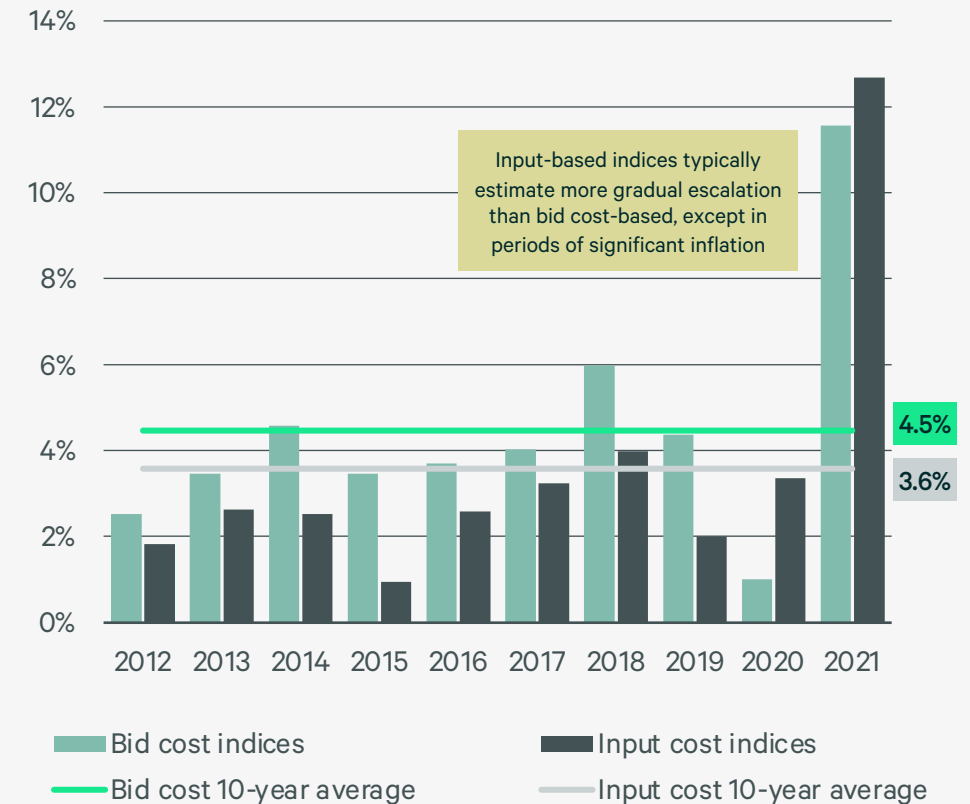
# Input costs lagged bid costs over the prior cycle but not dramatically

**Input-based indices do not fully capture construction costs and tend to underestimate escalation rates relative to bid cost indices, which provide the most comprehensive view of how builders experience final costs.**

During periods of price stability, bid cost and input indices produce similar escalation estimates. However, bid costs usually increase faster than input costs during periods of heightened construction activity as contractors boost margins (note the wider spreads between averages 2015 and 2019).

Historically, most indices of either type have shown construction costs rising roughly 2%-4% per year, and the differences between major bid cost indices and input cost indices has been less than one percentage point over the past 10 years.

**FIGURE 41:** Average annual construction cost escalation, major indices by type



Sources: BLS, Engineering News-Record, Turner Construction, Rider Levett Bucknall, Mortensons, CBRE Cost Consultancy, CBRE Strategic Investment Consulting, April 2022.

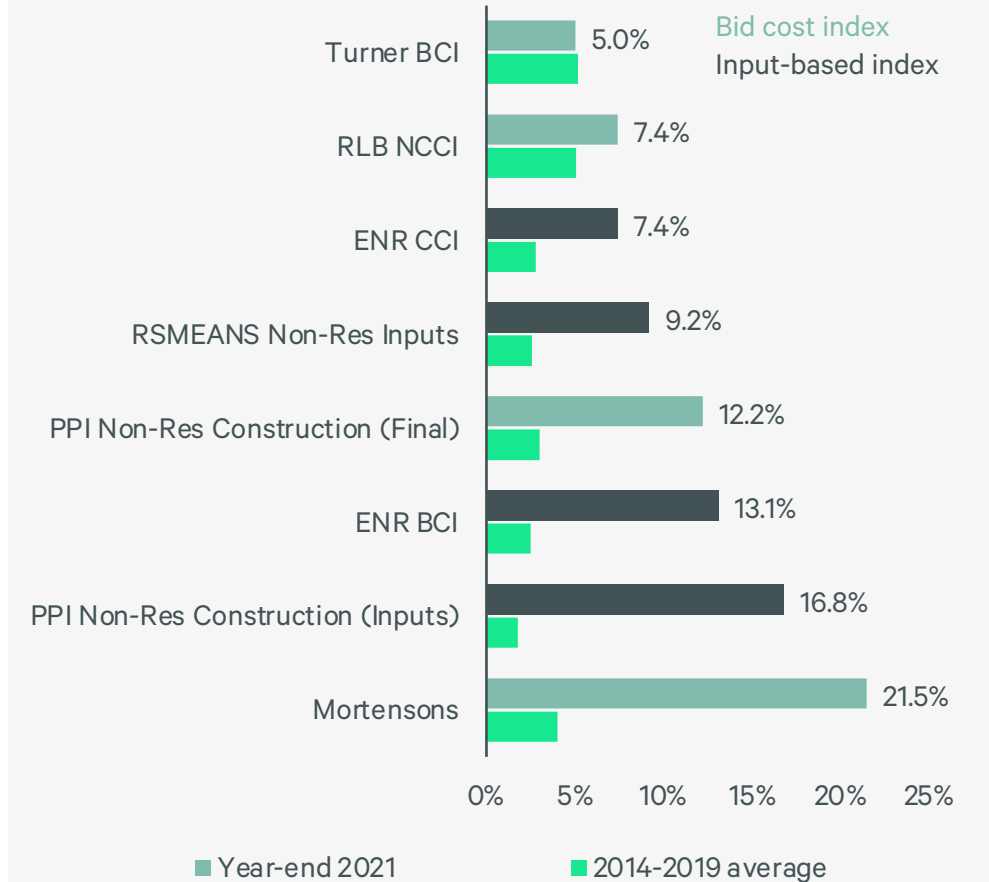
# Bid cost indices struggled to capture the realities of 2021

**The spread in escalation rates reported by major indices was wider in 2021 than ever before, owing to significant measurement challenges.**

During periods of high inflation or volatility, bid cost indices may lag input-based indices, as contractors react gradually to new market conditions or struggle to make accurate estimates in the face of market uncertainty. Despite all the indications that conditions are not the same as in recent years, some major bid cost indices, like Turner and Rider Levett Bucknall (RLB), reported 2021 escalation as essentially on par or just modestly above the five-year pre-pandemic average.

Meanwhile, all major input indices show a dramatic departure in 2021 from the pre-pandemic average. Unless contractors are willing to absorb the entirety of these input price hikes, bid cost indices should rise in 2022 as contractors recoup costs and protect themselves against future cost growth.

**FIGURE 42:** Comparison of construction escalation, major industry benchmarks



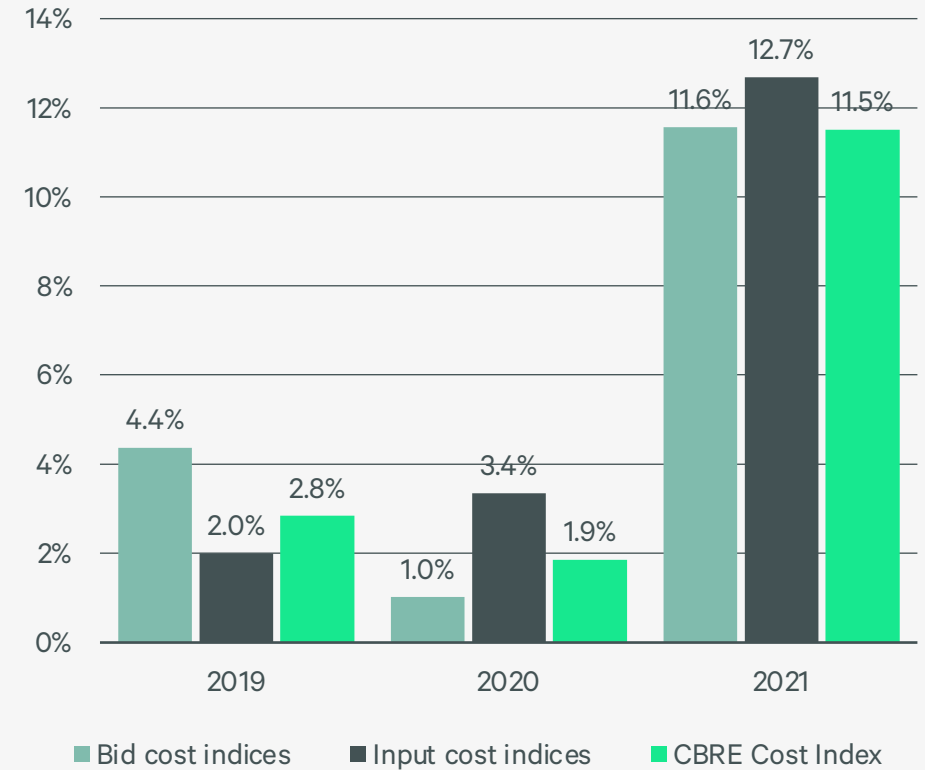
Sources: BLS, Engineering News-Record, Turner Construction, Rider Levett Bucknall, Mortensons, CBRE Cost Consultancy, CBRE Strategic Investment Consulting, April 2022.

# CBRE index aims to balance bid and input costs

We set out to create a new index that incorporates construction demand but was also more responsive to input prices. The goal is to capture both the full picture of construction costs and the impact of rapid price changes.

In 2021, the CBRE Construction Cost Index increased by 11.5%. This increase was in the middle of the range indicated by the major indices in 2021 (see range in Figure 42). The two prior years also show how the index balances swings in costs. In 2019, the index reflected a tempered view of the strong construction demand shown by the major bid cost indices, given the modest labor and material price gains as shown by the input cost indices. Conversely, when input costs began spiking and demand slowed in 2020, the index balanced both trends, landing in the middle of bid and input cost indices.

**FIGURE 43:** Average annual construction cost escalation, CBRE vs. major indices



Source: BLS, Engineering News-Record, Turner Construction, Rider Levett Bucknall, Mortensons, CBRE Cost Consultancy, CBRE Econometric Advisors, CBRE Strategic Investment Consulting, April 2022.

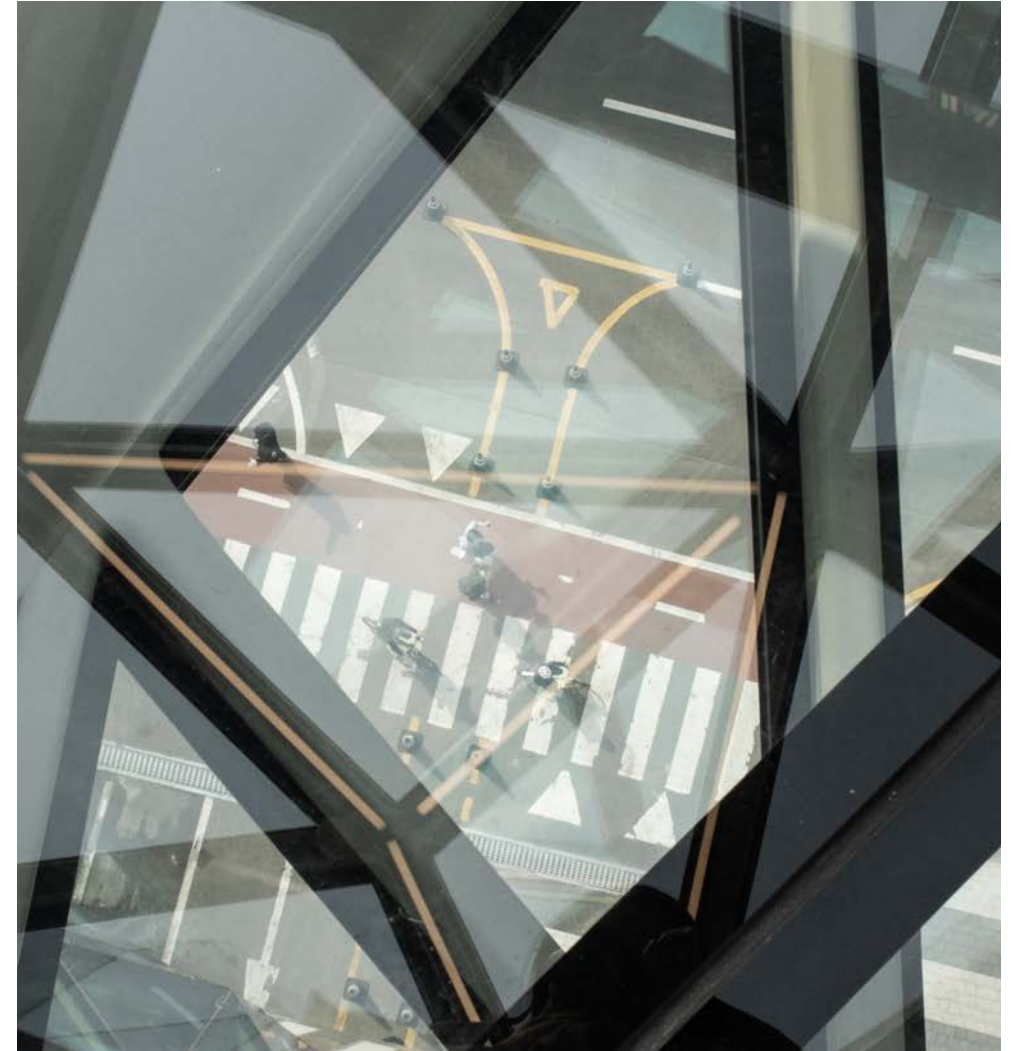
## CBRE Construction Cost Index points to elevated cost growth in 2022

**Given the significant growth in labor and materials costs that has already occurred year-to-date and the expected pace of construction activity through the end of the year, construction costs are projected to increase by 14.1% in 2022 in our baseline view.**

Thereafter, improvement in supply disruptions and moderating inflation are expected to rein in input costs, leading to significant decreases in the escalation rate each quarter of 2023 and stabilization in 2024.

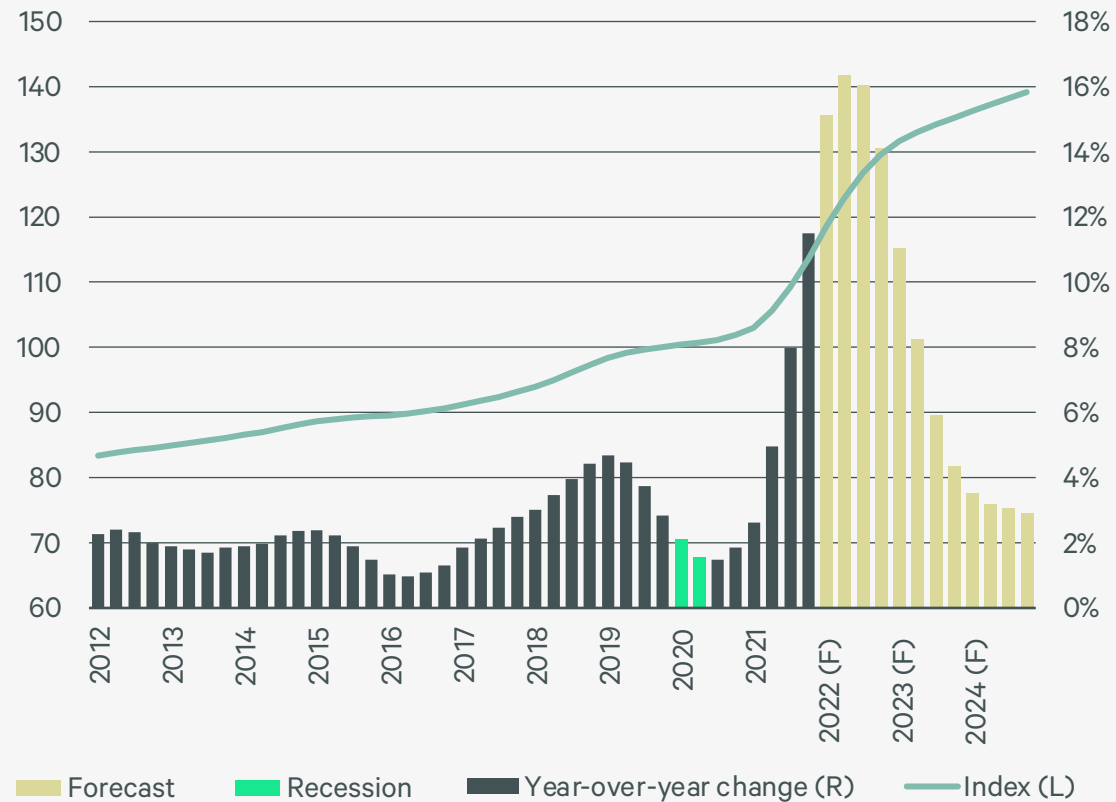
However, demand is the key factor in projecting true construction costs, and a continued rise in interest rates has the potential to temper expectations for stronger construction activity once inflation cools. The looming threat of slowing or negative economic growth may cause some projects to pause and could make the debt market a major obstacle. In the event that financing does slow construction activity, our decreased demand scenario projects year-over-year cost growth to be an average of 150 basis points lower than in the baseline scenario. This difference would primarily be felt in late 2023 and 2024, as most projects already in the pipeline are expected to move forward.

However, we do not expect the index to fall at any point in this forecast period in either scenario, though prices for some specific materials could decline. By year-end 2024, the baseline scenario is projected to be nearly 40% higher than Q4 2019, while the decreased demand is expected to be 33% higher.



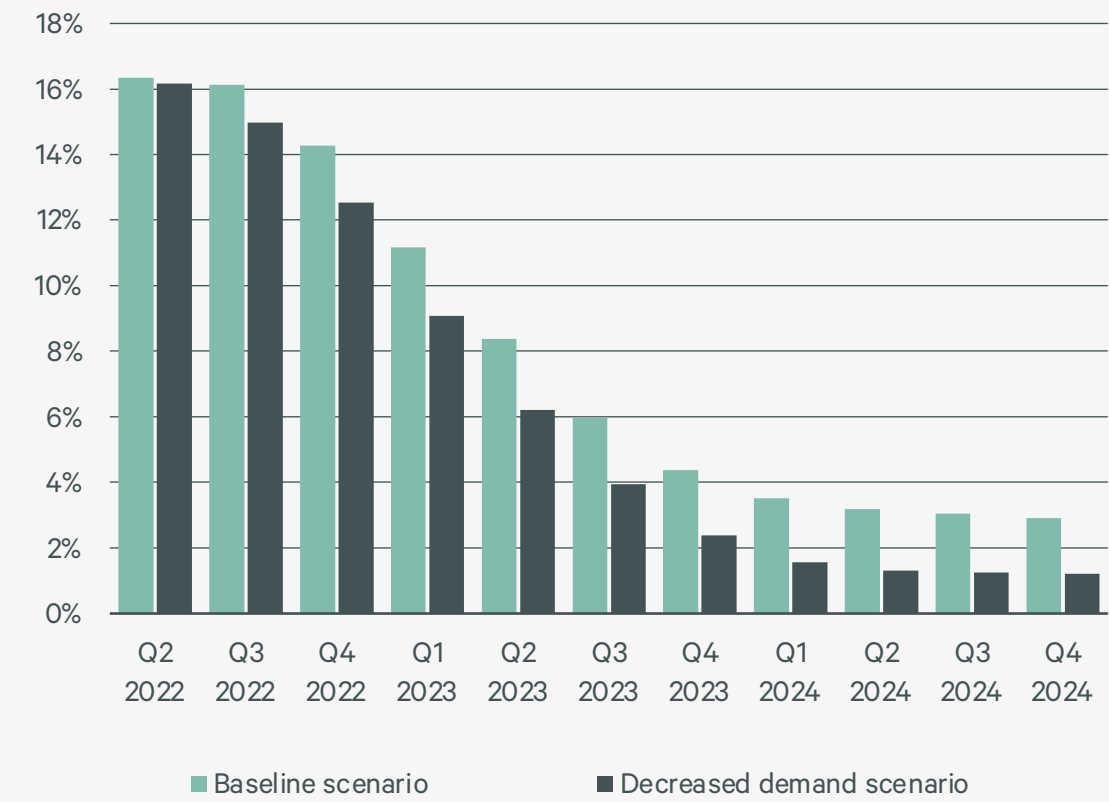
**FIGURE 44:** Historical CBRE Construction Cost Index performance, baseline scenario

Index (Q4 2019=100)



Source: CBRE Econometric Advisors, CBRE Strategic Investment Consulting, April 2022.

**FIGURE 45:** CBRE Construction Cost Index forecast scenarios, year-over-year change



Source: CBRE Econometric Advisors, CBRE Strategic Investment Consulting, April 2022.

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## CBRE Project Management

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