

HOME/ WORK

**Office-to-Residential Conversions
Are on the Rise—What Does That
Mean for Cities?**

By Jon Gorey

IT MAKES SO MUCH SENSE, at least on paper: A lasting shift in workplace norms has left many downtown office buildings half empty for much of the week, along with the surrounding delis, drugstores, and coffee shops that long relied on daily commuter dollars. As vacancies mount, commercial property values will drop, which could affect property tax revenues. Meanwhile, in the more residential neighborhoods outside of those drowsy downtown districts, a severe shortage of housing has pushed prices past tenable levels for homebuyers and renters alike.

So why not convert some of those empty offices into homes, creating much-needed new housing and bringing more people (and spending) downtown, while at the same time capturing the climate and sustainability benefits of building reuse and dense urban living?

That's a question being raised in cities all over the world, as remote and hybrid work schedules evolve from exception to rule for a sizable portion of the workforce. But while office-to-residential adaptive reuse appears to be a promising solution, the reality is more complicated.

MORE THAN half of American workers—some 70 million people—can perform their jobs remotely, according to a June 2022 Gallup analysis, and a mere 6 percent ever want to return to working full-time in an office; most say they would look for a different job if their employer forced the issue. Gallup forecasts that more than half of those remote-capable employees will work a hybrid schedule going forward, and 22 percent will work entirely offsite in the years to come (Wigert and Agrawal 2022).

As remote and hybrid work arrangements become not just accepted but expected, companies are consolidating the amount of office space they lease while trying to make commuting worth the effort for employees. Often that translates to

renting less square footage in a pricier building with new, high-end finishes and state-of-the-art amenities—what's known in commercial real estate as Class A space.

That leaves older, less attractive Class B or Class C offices—which comprise the majority of built workspace—struggling to find or keep tenants. Nationwide, the office vacancy rate surpassed 17 percent in the fourth quarter of 2022, up from 12.1 percent in late 2019, according to the commercial real estate company CBRE.

It's a trend that shows no signs of easing, and some cities are faring worse than others. CBRE estimated San Francisco's commercial vacancy rate to be 27.3 percent at the end of 2022; it was just 4.8 percent before the pandemic. Phoenix finished the year with nearly 24 percent of its offices unleased, up from 14.4 percent in late 2019 (CBRE 2023).

And central business districts, in particular, are reeling. For the third straight quarter, downtown offices had higher vacancy levels (17.6 percent) than suburban ones (17.2 percent), flipping the historical trend. The vacancy rate for downtown office buildings was 10.2 percent in late 2019.

In Denver's Upper Downtown, the office vacancy rate was already increasing before the pandemic, and had reached 21 percent by mid-2022, says Laura E. Aldrete, executive director of Community Planning and Development. But city leaders are choosing to see it as an opportunity. "We have an affordable housing crisis integrated into that," Aldrete says. "So how can we take two negatives and make it a positive?"

Downtown offices are sitting empty, while the cities they anchor desperately need housing. Could those unused cubicles and conference rooms be converted into homes?



Denver's Upper Downtown, left, lacks the vitality of Lower Downtown, right. Planners hope encouraging office conversions will change that. Credits (l-r): Sportstock via E+/Getty Images, Wim Wiskerke/Alamy Stock Photo.

Mixing It Up

Late in the pandemic, Aldrete noticed something as she walked around Querétaro City, Mexico: At a time when many American downtowns still felt eerily empty due to lingering office closures, Querétaro City was *alive*. Plenty of workplaces had shut down in Mexico, too, but the city center was still abuzz with people, including families with young children. “It’s a city from the 1500s that has a series of public realm plazas, with pedestrian-oriented streets and residential, office, and retail [spaces], and it was thriving,” Aldrete says.

She saw a similar pattern emerging in sections of downtown Denver. The city’s central business district, Upper Downtown, is a throw-back to the urban renewal era—concrete office buildings, one-way streets, parking lots—and has yet to wake up from its COVID-induced slumber. But Lower Downtown (“LoDo”), a historical, mixed-use neighborhood whose once-empty warehouses were converted to lofts and restaurants in the 1980s and ’90s, stayed relatively active through the pandemic. So did the Union Station neighborhood, which experienced its own mixed-use renaissance in the past decade, with the high-profile renovation of the

city’s train station sparking a greater focus on parks and mixed-income housing. “Today, in comparison to Upper Downtown, those two downtown neighborhoods continue to thrive,” Aldrete says.

Even before the pandemic, Aldrete could see that Upper Downtown’s nine-to-five vibe lacked the vitality 21st-century employers wanted. “Historically, all the banks, oil, and gas companies have scrambled to have their address on 17th Street,” Aldrete says—a stretch of Upper Downtown nicknamed “The Wall Street of the Rockies.” But when BP was looking for a regional headquarters seven years ago, the company bypassed 17th Street in favor of a Union Station location. Then COVID hit, “and it became very apparent that we did not have a neighborhood [in Upper Downtown] . . . no one was there,” she says. That raised the question: “How could we think about transforming our central business district into a central *neighborhood* district?”

Denver is now piloting a program that will invite up to five property owners to work with the city to convert their underused office buildings into residences. Aldrete has encouraged the owners of the historical but half-vacant Petroleum Building, among others, to participate, since they already had plans to convert the

That raised the question: “How could we think about transforming our central business district into a central *neighborhood* district?”

office tower into more than 100 apartments; she hopes a few successful pilot projects can pave a path for others to follow.

“In real estate, it’s the first ones who take the highest risk,” Aldrete says. “One of the roles city government can play is working with the private sector . . . how do we show up as good partners to move them through the process?”

The neighborhood already has entertainment venues and perhaps the best transit access in the city, including buses and light rail, Aldrete says, but it lacks other amenities that would draw full-time residents—“the heart of any community.” So at the same time, Denver is working with community partners to find other ways of creating “a complete neighborhood” downtown, from attracting more childcare facilities, to increasing the tree canopy outside of residential conversions, to activating ground-floor retail spaces through programs like PopUp Denver, which provides local entrepreneurs a rent-free storefront for three months.

Sustaining Downtown

Adaptive reuse presents logistical challenges, but also possibilities—including the potential to revive struggling downtowns and sustain them in a new way, says Amy Cotter, director of climate strategies at the Lincoln Institute of Land Policy. “There’s a lot of hand-wringing about the evolution of office space being a death knell for our city centers,” says Cotter, a former planner who focuses on urban policy and climate resilience. But converting excess workspace to housing offers the prospect of a 24/7 population keeping a city vibrant and economically healthy—“just differently than when we had central business districts with a nine-to-five daytime population and suburbanites commuting in,” she explains.

The urban routines of the last few decades had become predictable and unsustainable, Cotter says: “During the day, you’ve got office

workers parking and eating at restaurants, and then at night, you’ve got condo owners or apartment dwellers parking and eating out in restaurants,” she says. “Well—what if there wasn’t that switchover? What if it was the same population there, not only working, living, eating, and recreating in the same space, but not putting those miles on a car, and maybe even avoiding ownership of a car entirely?”

That sounds a bit utopian, Cotter admits, and yet it’s not unrealistic. After all, adaptive reuse is nothing new. As domestic manufacturing waned in the late 20th century, vacant textile mills and factories in the Northeast and Midwest were repurposed into sought-after artist studios and residential lofts. Dwindling church attendance has given rise to converted condos with literal cathedral ceilings. And in Lower Manhattan, revitalization efforts that started in the mid-1990s and accelerated after 9/11 have led to roughly 20 million square feet of office space being converted into about 17,000 homes, according to a study published by New York City’s Office Adaptive Reuse Task Force in January (City of New York 2023).



Adaptive reuse at Boott Mills, a former cotton mill in Lowell, Massachusetts.
Credit: John Penney via iStock Editorial/Getty Images Plus.

Workers update the roofing on a high-rise in Manhattan's financial district for the building's conversion to residential apartments. Credit: AP Photo/Bebeto Matthews.



Repurposing a structure, instead of demolishing it and rebuilding, keeps carbon out of the atmosphere and construction waste out of landfills. The United States generated 600 million tons of construction and demolition debris in 2018, according to the Environmental Protection Agency—more than double the amount of all our municipal solid waste—and 90 percent of it came from the demolition of existing buildings (US EPA 2022). Meanwhile, conventional building materials are extremely carbon-intensive; concrete and steel production each account for at least 8 percent of global greenhouse-gas emissions.

That's why adaptive reuse “almost always offers environmental savings over demolition and new construction,” according to the National Trust for Historic Preservation Research and Policy Lab, which notes that it takes 20 to 30 years of high-efficiency operation for most new buildings to finally offset the initial climate impact of their construction (Frey, Dunn, and

Cochran 2011). Keeping a building's foundation and framing intact while giving its facade a face lift and updating its heating, cooling, insulation, and other systems has the added benefit of drastically improving the energy efficiency of the building's operations, reducing energy consumption by up to 40 percent.

It can also be economical. While office conversions can get complicated, says Robert Fuller, New York-based principal and studio director at the global architecture firm Gensler, “compared to demolishing and building brand new, they generally come in at a lower cost per unit than new construction would.” CBRE estimates the cost of retrofitting one office building to apartments in Alexandria, Virginia, would be \$213 per square foot, compared to \$275 per square foot if it were built new. The process can be quicker, too: Developers told the Urban Land Institute that reuse can shave six to 12 months off the construction timeline (Kramer, Eyre, and Maloney 2023).

Keeping a building's foundation and framing intact while giving its facade a face lift and updating its heating, cooling, insulation, and other systems has the added benefit of drastically improving the energy efficiency of the building's operations, reducing energy consumption by up to 40 percent.

Mid-Century Meh

What makes the present reuse movement more challenging than converting mills and churches is the *type* of office buildings that need to be converted. A lot of the commercial space sitting vacant now is in the unglamorous, blocky towers of the 1960s, '70s, and '80s.

“They’re not really thought of as historic buildings just yet,” Fuller says. Along with aging systems, those mid-century monoliths often have sprawling, block-deep footprints—placing the core of the building upwards of 40 or 50 feet from the nearest (inoperable) window—and drab, unwelcoming facades.

Many of the Lower Manhattan buildings that got converted after 9/11 were prewar buildings with smaller floor plates and traditional framed window openings, Fuller says. “I don’t want to say they were easy conversions, but they made a lot of sense. Some of these 1960s and '70s buildings . . . definitely have their challenges.”

Architects can still overcome those issues—it’s usually just a matter of financial feasibility.

For example, Fuller says, “If the building has a large enough floorplate, you can actually create a lightwell down the center,” drawing daylight deep into the building core.

Such space can be repurposed in other ways, too. When Gensler was converting Philadelphia’s Franklin Tower from offices to apartments a few years ago, the company decided to stack the building’s new amenities—including a Peloton cycle studio, fitness center, and theater—through the center of the building on different floors, making use of otherwise dead space deep within the building’s core. “Rather than doing one amenity floor, which is quite common in a residential building,” Fuller says, “you can imagine this vertical spine of amenities that runs up through the building.”

Another challenge in adapting older office buildings is updating the curtain wall, or nonstructural exterior facade. This isn’t just to modernize the aesthetic and improve energy efficiency, but also to install operable windows, which most office buildings lack—and most cities require of residential units.



During the conversion of Philadelphia’s Franklin Tower, the 1980s concrete structure (left) was clad in glass and aluminum (right), and its narrow strips of windows replaced with large windows and private balconies. Credits (l–r): Courtesy of Gensler; Robert Deitchler, courtesy of Gensler.



A common area at Philadelphia's converted Franklin Tower, left, and a living room in one of its 550 residential units, right. Credits (l-r): Robert Deitchler, courtesy of Gensler; courtesy of PMC Property Group.

Despite these barriers, unremarkable office buildings can still be a good foundation for attractive housing, offering enviable locations and luxurious structural features like high ceilings. A 12-foot floor-to-floor height isn't considered Class A standard for modern office space, Fuller says, "but it's very generous for a residential building."

To help cities identify potential reuse candidates, Gensler developed a proprietary scorecard that awards points for a building's location, configuration, elevator service, and other factors. "It's a way to kind of quickly look at a broad swath of buildings and identify the best contenders," Fuller says—because not every vacant office tower will make a sensible conversion project.

Only 10 of 84 buildings Gensler evaluated in Boston's financial district, for example, ranked high enough to merit consideration as reuse targets (Carlock 2022). That may not sound like a lot. But even if most mid-century office towers don't ultimately pencil out for residential reuse, converting just a few can create hundreds or even thousands of new homes in housing-starved cities. "Given the millions of square feet of underutilized office space, even a small

percentage of that could really move the needle from a housing standpoint," Fuller says.

That's one reason New York's Office Adaptive Reuse Task Force is recommending 11 policy changes that would allow for and encourage the conversion of more office buildings in more neighborhoods (City of New York 2023). "We want to ensure that outdated office buildings can be converted to more in-demand uses, such as desperately needed homes for New Yorkers," planning director Dan Garodnick writes. Among the task force's recommendations, which followed a five-month study: loosening rules to allow the conversion of most office buildings built prior to 1991 and offering property tax incentives to support the creation of affordable housing and childcare facilities in repurposed buildings.

And in Washington, DC, where some 20 million square feet of office space sits vacant and Mayor Muriel Bowser has pledged to bring 15,000 new residents to downtown in the next five years, the city will offer 20 years of tax relief to developers who convert office buildings to residences, as long as 15 percent of the homes are designated affordable to those earning 60 percent or less of area median income.

Even if most mid-century office towers don't ultimately pencil out for residential reuse, converting just a few can create hundreds or even thousands of new homes in housing-starved cities.

CURRENCY CONVERSION: ADAPTIVE REUSE AND PROPERTY TAX REVENUE

The commercial property tax base is an important part of the revenue mix in most center cities. So does converting office space lead to a major loss of revenue? Not necessarily.

Though commercial buildings are often taxed at a higher rate than primary residences—75 percent higher, on average, according to a Lincoln Institute property tax analysis of the largest cities in each state—they don't necessarily provide the bulk of a city's property tax revenue (Lincoln Institute of Land Policy/Minnesota Center for Fiscal Excellence 2022). In a 2021 study of eight central US cities by the Institute on Taxation and Economic Policy, commercial real estate accounted for 37 percent of city property tax collections on average (ITEP 2021). And dependence on the property tax itself also varies, with some cities relying more heavily than others on state aid or local sales and income taxes.

The authors of the ITEP study found that a predicted 12 to 25 percent plunge in office property values would translate to a less dramatic 2 to 4 percent dip in overall revenue in most cities. That's still not a situation policymakers want to be in, says Adam Langley, associate director of tax policy at the Lincoln Institute, since it generally means either cutting services or raising taxes on remaining businesses, homeowners, or both. But it does suggest that, while converting an office building to residences may reduce the parcel's property tax obligation, the reclassification is unlikely to throw the city's finances into turmoil.

"The more fundamental issue is: What happens without these conversions?" Langley asks, adding that there's not yet much empirical evidence on this subject. "Having a high office vacancy rate, if it's permanent, is a bad thing. So if the alternative is having occupied condos and apartment buildings, even if they're paying lower property taxes, that seems like a better outcome."

Whatever approach cities take to revive their office districts, he suggests building some flexibility into their programs given the inherent uncertainty ahead, and cautions against locking in long-term tax abatements that may prove unnecessary a decade from now. After all, he points out, "it's not like you can just flip a switch and immediately convert millions of square feet of your city's office buildings into condos and apartments. It's going to take a long time to play out."



A sign of the times in New York's Times Square. Credit: Richard Levine/Alamy Stock Photo.

Converting Calgary

For better or worse, Calgary, Alberta, has a head start on many cities that are just starting to explore office conversions. A city of 1.3 million, Calgary has seen its share of booms and busts as the corporate capital of Canada's oil and gas industry. But when crude oil prices started sinking in 2014, they took the city's commercial property market down with them. Office buildings in downtown Calgary have lost about \$16 billion in property value since 2015, resulting in a loss of tax revenue that impacts the entire city.

"The conversations around our office vacancy issue started around 2015," says Natalie Marchut, program manager for Calgary's downtown strategy team. "Office vacancy had started climbing, we weren't seeing any reabsorption, and it started to become quite alarming." By the time COVID closures hit in 2020, there weren't a whole lot of downtown office workers left to send home.

So city officials worked with developers, businesses, and other partners to come up with a plan. With about a third of the office space downtown sitting vacant—some 14 million square feet—the city set a goal of removing six million square feet of office inventory over the next 10 years, ideally through residential conversions.

But as Isaac Newton would say, an object at rest tends to stay at rest, unless acted upon by an outside force. Even though converting a half-vacant office building to homes typically costs less than demolishing it and rebuilding from scratch, many property owners don't have the capacity or desire to take on such a big project, and instead succumb to inertia, letting buildings sit idle. "A big thing we realized was that most building owners weren't taking the initiative on their own to repurpose those vacant office towers," Marchut says.



The commercial property market in Calgary, Alberta, plummeted along with crude oil prices several years ago. Credit: dan_prat via E+/Getty Images.

So Calgary decided to offer financial incentives to kickstart the process. The city council approved an initial \$100 million in municipal funding in 2021—and another \$53 million in late 2022—to support adaptive reuse projects downtown, allowing the city to reimburse developers at \$75 per square foot of office space converted.

Even at that generous rate, which was calculated to cover about a third of the estimated \$225-per-square-foot cost of such conversions at the program's outset, some developers find it hard to make the numbers square, Marchut says, given rising interest rates and inflation. But the first two rounds of the program garnered far more project proposals than there was funding. The first 10 approved projects will subtract over 1 million square feet of office space from the downtown commercial market by converting it into some 1,200 new homes.

One concern that came up often in early discussions is that commercial properties are typically taxed at a higher rate than residential ones. "That was a big one that we had to get our heads around, but also help our council get their heads around: When you convert these to

With about a third of the office space downtown vacant, city officials worked with developers, businesses, and other partners to come up with a plan.

residential, they're going to be taxed at a lower rate, so we're not going to be getting what we could if they were fully occupied commercial spaces," Marchut says. "Yes. But we will not see the absorption of 14 million square feet of office space. We just will never get there."

The situation is so dire right now that some downtown buildings are assessed for their land value only, she adds. "Of course you need commercial property downtown, and of course they will always pay more to the city in tax revenue—but not if they're all empty," Marchut says. Meanwhile, removing excess inventory should reduce the vacancy rate, helping to stabilize and even restore the value of the remaining office space.

To accelerate conversions and attract as many applicants as possible, the city intentionally kept the program simple, without specific affordable housing requirements, for example. Marchut says that has allowed the city to prioritize projects that best align with its equity, climate, and planning goals.

"Every project that is coming online through this program is doing more than just converting office to residential," Marchut says. "We've got a few that are going to be doing affordable housing . . . we have others that are doing additional public realm improvements—and this is all optional. We don't require it, but applicants are coming to the table with really solid proposals, because they know the program is so competitive, and so they're kind of bringing their A game."

The program's first conversion project—the Cornerstone by Peoplefirst Developments, slated for completion later this year—is creating 112 family-oriented units, 40 percent of which will be priced at affordable rates, Marchut says. "They're also building three-bedroom units, which we don't have much of at all in the downtown," she notes. Another project, the 176-unit Palliser One by Aspen, plans to put in a public park and skating rink at ground level.

"Of course you need commercial property downtown, and of course they will always pay more to the city in tax revenue—but not if they're all empty."



The Cornerstone by Peoplefirst Developments, an adaptive reuse project in Calgary, will create a family-oriented residence (left) out of a commercial office building (right). Credit: Courtesy of Peoplefirst Developments.

The city is also investing \$163 million in placemaking and public realm projects, like revamping key pedestrian streets and extending its RiverWalk into the West End. “The other thing we’re really looking at is how to get more park space,” Marchut says. “Downtown, and particularly the West End, is starved for open public space, and if we’re looking to bring in new residents and families and children and all the rest, they’re going to need a place to go outside and play.”



Officials in Calgary are investing in the city’s RiverWalk and other amenities for new residents. Credit: Richard Cummins/Alamy Stock Photo.

One option that remains on the table for creating more parks downtown while reducing the glut of commercial space is the demolition of vacant office buildings that can’t be converted into something more useful. (An upcoming phase of the program will subsidize other types of office conversions as well, such as retail or arts venues.) “We are exploring incentivizing demolition for very specific properties,” Marchut says. “There are Class C buildings built in the ’70s that are full of asbestos, and also probably cannot actually be upgraded to meet new building code—they’re just simply at end of life.”

Calgary doesn’t have the kind of housing crisis facing larger cities like Toronto or Vancouver, but Alberta is still projected to gain 2 million new and mostly urban-dwelling residents by 2046. “With those numbers,” Marchut says, “we need to build more affordable housing, and we need to build more central housing . . . and these conversion projects will provide rental rates that are lower than new builds.” That’s something that will help both current and future Calgarians. “We’re going to see a finished product really soon,” Marchut says. “I’m super excited to finally see one open their doors and invite new residents in.”

It’s Not (Just) About the Money

Beyond the financial incentives, Calgary is taking other steps to encourage conversions. Most properties downtown, for example, are exempt from change-of-use permitting requirements. “That saves, on average, six months,” Marchut notes, and removes the risk that projects could be bogged down or blocked altogether.

Since developers need to invest an enormous amount of time and money in a project even before proposing it to the city, simply indicating general support for conversions provides an important boost in confidence, Marchut said. “Obviously, you can’t guarantee an approval until you have a plan set in front of you that you can review against the rules. But a notional, ‘Yes, the city is supportive of what you’re trying to achieve on this site,’ goes a long way in giving comfort to developers.”

Back in Denver, Aldrete doesn’t have incentive dollars to encourage investment, so she’s hoping that a “higher-touch” review and approval process, led by an in-house coordinator dedicated to office conversions, will drastically reduce the time it takes for developers to get projects moving. “You essentially cut off two to three months for every review cycle you can reduce, to get them out the door and under construction. So that is real money to the developer,” she says. “That’s how we’re trying to win them over.”

Fuller says that, even as some cities embrace reuse, others are lagging behind. “The time is ripe to change some of our zoning and our legislative policies that could help catalyze this type of conversion,” he says, while emphasizing that quality and safety should not be sacrificed. “We’ve come around to realize that having a mix of uses in the same location is actually healthy for cities, in terms of generating 24/7 activity and eyes on the streets and all those things that we know are good. So I’m optimistic that good things will come of this.”

Cotter is also optimistic that this surge in post-pandemic interest in office conversions will create a lasting trend. “There’s all sorts of creative adaptive reuse that’s happening that is going to give architects, construction firms, and city code officers experience with how this can be done, and lay the groundwork for it to be done more readily,” Cotter says. “And wouldn’t we all be well served if our buildings, once constructed, could evolve with us?” □

Jon Gorey is a staff writer at the Lincoln Institute of Land Policy.

“We’ve come around to realize that having a mix of uses in the same location is actually healthy for cities, in terms of generating 24/7 activity and eyes on the streets and all those things that we know are good. So I’m optimistic that good things will come of this.”

REFERENCES

- Carlock, Catherine. 2022. “Boston Explores Converting Office Buildings into Housing, But Challenges Abound.” *Boston Globe*. September 21. <https://www.bostonglobe.com/2022/09/21/business/boston-explores-converting-office-buildings-into-housing-challenges-abound>.
- CBRE. 2023. “The Rise and Fall of Office to Multifamily Conversions: A Real Estate Investigation.” Dallas, Texas: CBRE. March 14. <https://www.cbre.com/insights/viewpoints/the-rise-and-fall-of-office-to-multifamily-conversions-a-real-estate-investigation>.
- City of New York. 2023. “New York City Office Adaptive Reuse Study.” New York, NY: New York City Department of City Planning. January. <https://www.nyc.gov/assets/planning/download/pdf/plans-studies/office-reuse-task-force/office-adaptive-reuse-study.pdf>.
- Frey, Patrice, Liz Dunn, and Rick Cochran. 2011. “The Greenest Building: Quantifying the Environmental Value of Building Reuse.” Washington, DC: National Trust for Historic Preservation. https://living-future.org/wp-content/uploads/2022/05/The_Greenest_Building.pdf.
- ITEP (Institute on Taxation and Economic Policy). 2021. “The Impact of Work from Home on Commercial Property Values and the Property Tax in US Cities.” Washington, DC: Institute on Taxation and Economic Policy. November 4. <https://itep.org/the-impact-of-work-from-home-on-commercial-property-values-and-the-property-tax-in-u-s-cities>.
- Kramer, Anita, Nolan Eyre, and Morgan Maloney. 2023. “Behind the Façade: The Feasibility of Converting Commercial Real Estate to Multifamily.” Washington, DC: Urban Land Institute. https://knowledge.uli.org/-/media/files/research-reports/2023/behind-the-facade_conversion-report.pdf.
- Lincoln Institute of Land Policy/Minnesota Center for Fiscal Excellence. 2022. “50-State Property Tax Comparison Study for Taxes Paid in 2021.” Cambridge, MA: Lincoln Institute of Land Policy. July. <https://www.lincolnst.edu/publications/other/50-state-property-tax-comparison-study-2021>.
- US EPA (Environmental Protection Agency). 2022. “Construction and Demolition Debris: Material-Specific Data.” Website. <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/construction-and-demolition-debris-material>.
- Wigert, Ben, and Sangeeta Agrawal. 2022. “Returning to the Office: The Current, Preferred, and Future State of Remote Work.” Washington, DC: Gallup. August 31. <https://www.gallup.com/workplace/397751/returning-office-current-preferred-future-state-remote-work.aspx>.