



ABR Capital Partners — Research

The Built Environment and Climate Change

How the CRE Community Can Support Decarbonization
Efforts and the Benefits of Doing So

Contents

- Executive Summary 3
- Climate Risk 5
- Managing Climate Risk 11
- Rent, Revenue and Sales Price Premiums 16
- Green Financing 20
- Conclusion 24

Executive Summary

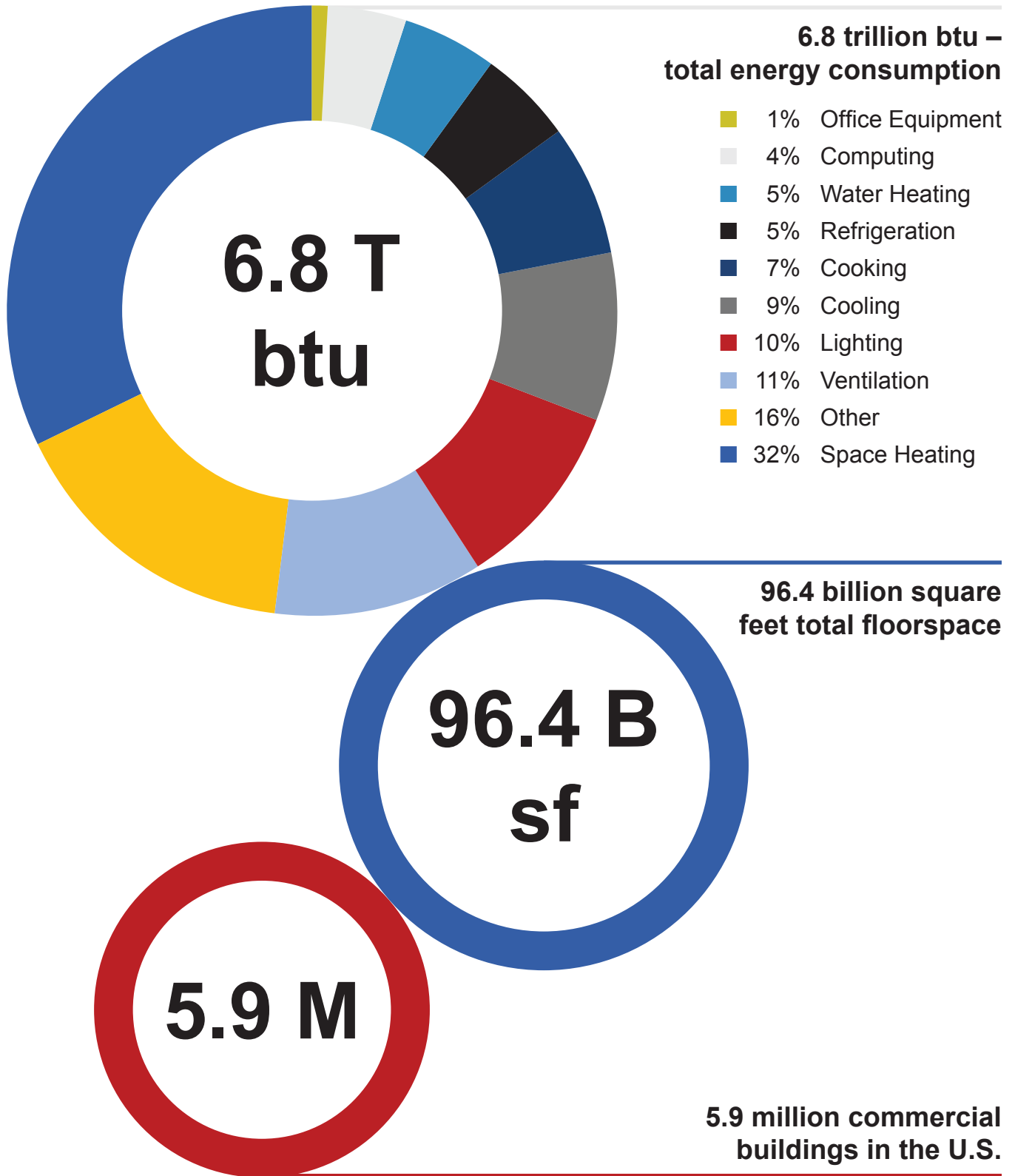
Greenhouse gases (GHGs) trap heat in the Earth's atmosphere, warming the planet, changing the climate, and increasing the frequency and intensity of extreme weather events.

These events can include severe wildfires, heatwaves, droughts, hurricanes, tornadoes, ice storms, floods, tropical cyclones and others. At the same time, population growth and infrastructure expansion are putting more people and property in harm's way, leading to more casualties, property destruction and financial losses. The most prominent type of greenhouse gas is carbon dioxide (CO₂), which is produced when fossil fuels are burned to generate energy. In the United States, CO₂ emissions (commonly referred to as carbon emissions) account for 79% of all greenhouse gas emissions, followed by methane (11%), nitrous oxide (7%) and fluorinated gases (3%).¹ Moreover, the built environment is responsible for roughly 40% of global carbon emissions and 35% of U.S. carbon emissions.²

Carbon emissions generated by buildings include both embodied emissions and operational emissions. Embodied emissions are produced during the construction phase from the extraction, manufacture, maintenance, transportation, installation and disposal of building materials. Depending on the methods and materials that are used during construction, embodied emissions can account for anywhere between 20% and 50% of a building's total emissions during its lifecycle.³ Operational emissions account for the balance and are produced by burning fossil fuels onsite to generate energy (i.e., direct emissions), and by purchasing energy derived from fossil fuels from utility providers (i.e., indirect emissions). Fossil fuels are nonrenewable energy sources such as coal, oil, natural gas and nuclear energy. They cannot be replaced once they have been used. Leading causes of operational emissions include burning fossil fuels for space heating, ventilation, lighting, cooling, cooking, refrigeration and heating water.

The built environment's impact on carbon emissions has provided commercial real estate investors, owners and operators with a meaningful opportunity to address climate change and the damage it causes. This report explores some of the ways the CRE community can lead in this area and the benefits of doing so.

U.S. Commercial Buildings



Source: U.S. Energy Information Administration⁴

Climate Risk



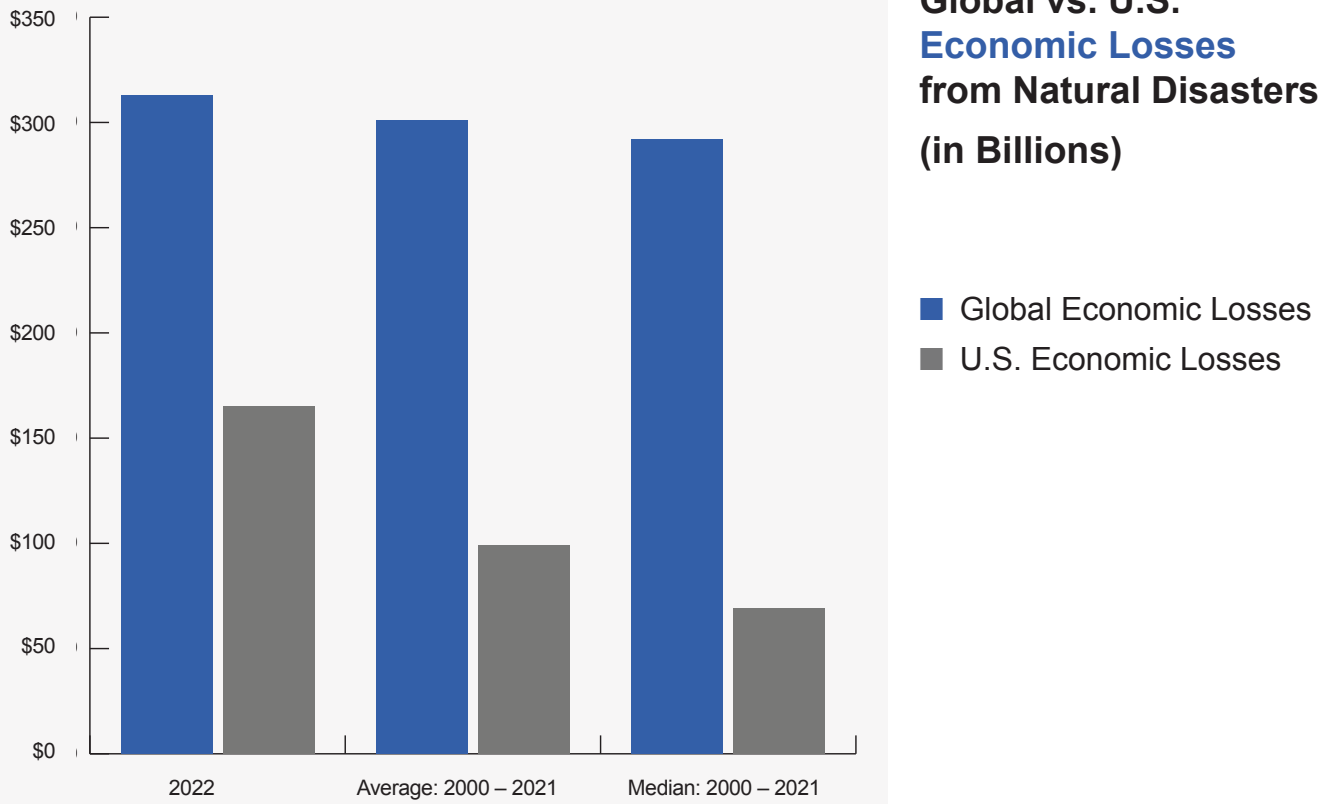
Here are two risk categories encountered by building owners that are associated with climate change: physical risk and transition risk.

Combined, these terms are referred to as climate risk. Individually, physical risk is the likelihood that a property will be physically damaged by an extreme weather event caused by climate change. For example, the risk of sustaining damage from a flood, ice storm, tornado, fire, or some other adverse weather event. Whereas transition risk refers to costs that could be incurred by an organization in its efforts to manage and adapt to societal and economic shifts towards a low-carbon future. These costs could come from changes in technology, consumer preferences, markets and public policy because of efforts to reduce emissions.

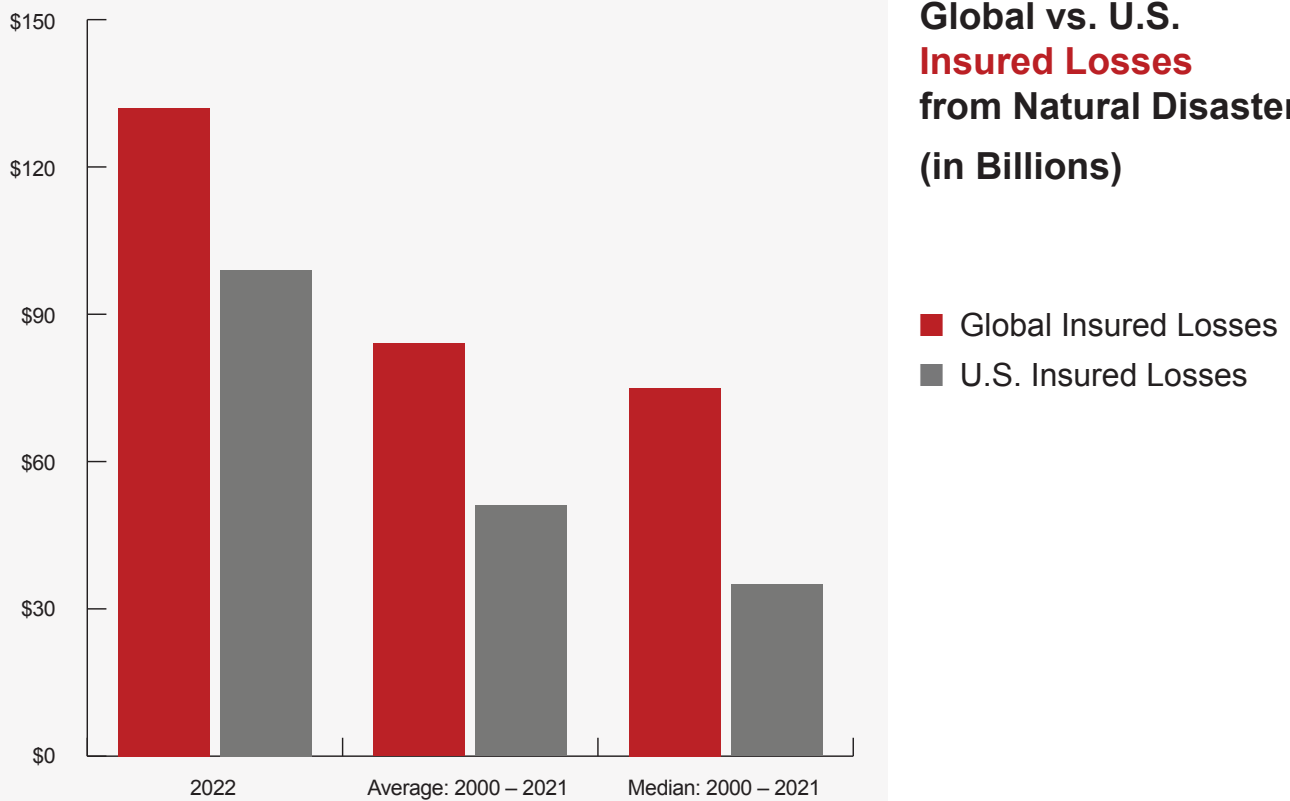
Physical Risk

Assessing and pricing physical risk is an evolving and complicated task for the CRE community. The market generally prices physical risk through insurance, and as extreme weather events and the cost of developing commercial real estate have increased, insurance premiums have also risen. In 2022, severe weather events caused an estimated \$313 billion in economic losses worldwide and \$165 billion in economic losses in the United States.⁵ Insured losses, which represent the portion of economic losses that are covered by public or private insurance entities, tallied \$132 billion worldwide and \$99 billion in the United States for the year.⁶ These figures are well above their inflation-adjusted averages and medians for the period 2000 to 2021. Larger insurance payouts are encouraging reinsurance companies to exit high-risk states, such as Florida and Texas, and the companies that remain are raising their premiums by substantial amounts, in excess of 50% in some cases.⁷ Commercial real estate investors need to make sure they understand the physical risk profile of the markets they invest in, the probability of material increases in insurance premiums during their hold period and the impact this could have on their investments' financial performance.

**Global vs. U.S.
Economic Losses
from Natural Disasters
(in Billions)**



**Global vs. U.S.
Insured Losses
from Natural Disasters
(in Billions)**



Source: Aon, 2023 Weather, Climate and Catastrophe Insight Report[®]

Transition Risk

Transition risk is the risk of higher costs for an organization as it makes changes to adapt to societal and economic shifts towards a low-carbon future. These costs could come from changes in technology, consumer preferences, markets and public policy. For example, to attract climate-conscious tenants and maintain investor demand for their properties in a marketplace that is increasingly being oriented towards environmentally friendly products, building owners might need to make significant investments in renewable energy sources (e.g., onsite solar power generation), “smart” HVAC systems, water systems, lighting systems, waste disposal systems and other technologies that can monitor, optimize and reduce their properties’ carbon emissions. In addition to incurring costs from changes in technology, consumer preferences and markets, property owners also risk incurring substantial costs from changes in public policy.

Across the country, state and local governments are increasingly enacting legislation to address the threat climate change poses to peoples’ health, property and security. Many of these laws target commercial real estate and can include substantial fines for non-compliance. These fines reduce the affected property’s cash flows and can have an adverse impact on its marketability and valuation. One frequently cited example of climate change legislation that is affecting commercial real estate is New York City’s Local Law 97.

Local Law 97 was passed in an effort to reduce New York City’s carbon emissions by 40% by 2030, and 80% by 2050. To accomplish this, the law sets increasingly stricter limits on carbon emissions for properties that are larger than 25,000 sf.⁹ A fine is levied if a property fails to meet these limits. The emissions limit for every property type is available on New York’s Department of Building’s (DOB) website. Beginning in 2025, property owners must report their buildings’ carbon emissions figures to the DOB. To figure out how much operational carbon a building is producing, the amount of

energy the building is using must first be determined, and then multiplied by an “emissions factor.” An emissions factor is a coefficient that describes the rate at which a particular activity releases greenhouse gases into the atmosphere.¹⁰ Embodied carbon emissions are calculated by multiplying the quantity of a specific building material (e.g., the amount of steel used in the building’s frame) by its emissions factor. Emissions factors can be found in several online databases, including databases maintained by the U.S. Energy and Information Administration (EIA), Environmental Protection Agency (EPA) and the International Energy Agency (IEA). Different government agencies and private organizations also maintain online calculators and tools to help property owners calculate their buildings’ emissions.¹¹ Once they know the amount of carbon their buildings are emitting, property owners can check the

The rate environment for real estate-specific property is severely challenged, especially in Florida and Texas and along the Gulf Coast. This has caused a bifurcated market between catastrophe-exposed and non-catastrophe-exposed business, with the highest double-digit increases in properties that have negative risk attributes, such as older frames, a challenged loss history or undervalued assets.

***— Danielle Lombardo,
Chair, Lockton Global Real Estate.¹⁷***

DOB's website to determine if they are compliant with Local Law 97. Property owners have until 2024 to satisfy the law's initial carbon emissions limits and until 2030 to satisfy the law's second-tier limits. The maximum annual fine for non-compliance is the difference between a property's annual emissions limit and its actual emissions, multiplied by \$268.¹² Annual fine estimates for properties that are currently out of compliance range from tens of thousands of dollars to over \$1 million.

When Local Law 97 was passed in 2019, an estimated 20% of covered buildings were non-compliant with 2024's emissions limits and another 75% fell short of 2030's stricter limits.¹³ Accordingly, many property owners will need to upgrade their buildings or purchase emissions credits from renewable energy sources to comply with the law. Fortunately, there are several ways building owners can reduce their properties' carbon emissions. These methods include the following:



- Purchasing more renewable energy from utility providers.
- Installing solar panels onsite to produce renewable energy.
- Replacing fossil fuel dependent HVAC systems and appliances, such as gas-powered stoves and ovens, with energy efficient HVAC systems and appliances that use more renewable energy and generate fewer carbon emissions.
- Upgrading the building's insulation, and window and door seals to ensure that heat does not escape the building during the colder months and cool air does not escape the building during the warmer months.
- Adding smart windows to increase natural light and replacing conventional lighting with LED lighting.
- Replacing conventional toilets with high efficiency toilets that use less water.

While Local Law 97 might be the most prominent example of climate change legislation affecting commercial real estate, there are many other examples of similar laws that are impacting CRE. According to Moody's Investors Service, several major markets, including New York, San Francisco, Los Angeles, Washington, D.C., Boston, Chicago, Miami, Houston, Denver and Atlanta are preparing to levy fines on properties that are out of compliance with new legislation limiting emissions from large buildings.¹⁴ By the end of 2022, nearly half of the 100 most populated cities in the U.S., and 25 states, had established greenhouse gas reduction targets, with many of those targets impacting commercial real estate.¹⁵ The federal government has also taken action in this area, with President Biden signing an executive order establishing a goal of having a net zero emissions federal building portfolio by 2045.¹⁶

The proliferation of legislation targeting greenhouse gases emitted by buildings makes it imperative for property owners to stay informed on these policies in order to comply with them, avoid costly fines and better manage their portfolios' transition risk.

After implementing carbon emission reduction strategies — upgrading its chiller system and equipping all of its elevators with regenerative braking systems — the Empire State Building, which opened in 1931, was able to reduce its greenhouse gas emissions by 54% and is now compliant with Local Law 97, saving the building an estimated \$2.5M in annual fines.¹⁸



Managing Climate Risk



Managing climate risk requires the adoption of policies, procedures and best practices to address both physical and transition risks.

Physical risk is typically managed by determining the probability of a severe weather event occurring in a particular market and purchasing insurance for protection against such an event. Efforts to manage transition risk include monitoring climate change legislation and extending the useful life of properties (and their resilience to severe weather events) through renovation, refurbishment or adaptive reuse. In addition to generating less operational carbon through energy efficient upgrades, by foregoing new development and extending the life of their existing properties through value-add improvements, property owners can also reduce the amount of embodied carbon that would otherwise be emitted into the atmosphere. This is particularly important because embodied carbon emissions can account for up to half of a building's total emissions during its lifecycle. While new development is important and can be necessary to meet a community's needs, foregoing development projects and extending the life of an existing property through a renovation, refurbishment or adaptive reuse results in significant carbon savings.

A groundbreaking environmental impact study published by the Preservation Green Lab of the National Trust for Historic Preservation (PGL) illustrates the benefits of improved properties. For this study, researchers compared the projected amount of carbon emissions produced by newly constructed energy efficient buildings to the amount produced by existing buildings whose useful life had been extended through renovations, refurbishments or adaptive reuse. The analyzed properties were commercial office buildings, warehouse-to-office conversions, multifamily buildings, warehouse-to-multifamily conversions, mixed-use buildings, single-family residential buildings and elementary schools in Chicago, Atlanta, Phoenix and Portland. Different cities were used in the analysis to account for variances in energy consumption between regions with different climates. For all the property types that were analyzed, PGL found that because new construction generates a significant amount of embodied emissions, it can take between

10 and 80 years for a newly constructed building that is 30% more efficient than an existing building whose useful life has been extended, to achieve the same climate change benefits as the renovated existing building.¹⁹

PGL also compared carbon emissions from new construction to refurbished properties assuming both sets of properties emit the same amount of operational carbon over a 75-year period. In this scenario, PGL found that the climate change impact over this period from refurbished properties was 5% to 21% less than the climate change impact from newly constructed properties of similar size and functionality. PGL's findings are reflected in Exhibit I and express the climate change impact of a refurbished property as a percentage of the climate change impact of new construction. For example, the study concluded that largely because of the embodied carbon savings from refurbishing properties, the climate change impact of refurbished commercial office properties across all four markets that PGL analyzed was just 89% of the impact from new construction.

Exhibit I:

Impact on Carbon Emissions from Improved, Refurbished and Renovated Properties vs New Construction

- New Construction (represents 100%)
- Improved, Refurbished and Renovated Properties:
Average of Chicago, Atlanta, Phoenix, and Portland

**Exhibit I uses the average savings across Chicago, Atlanta, Phoenix and Portland because the spread between each market is not statistically significant.*

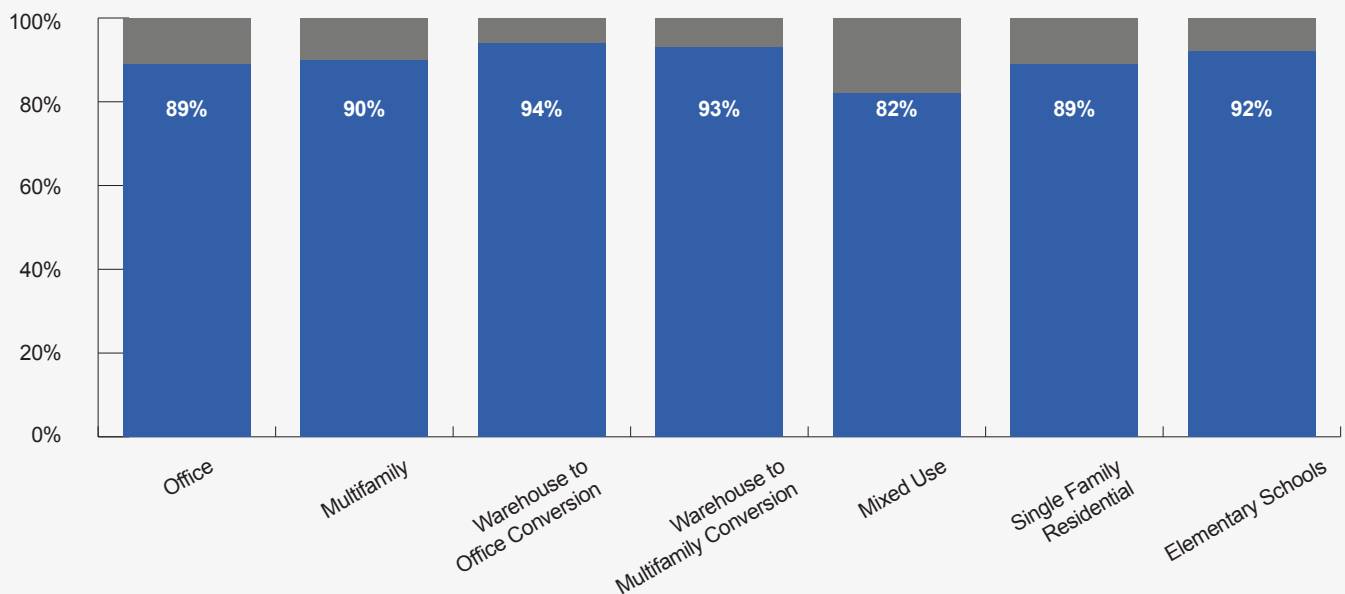
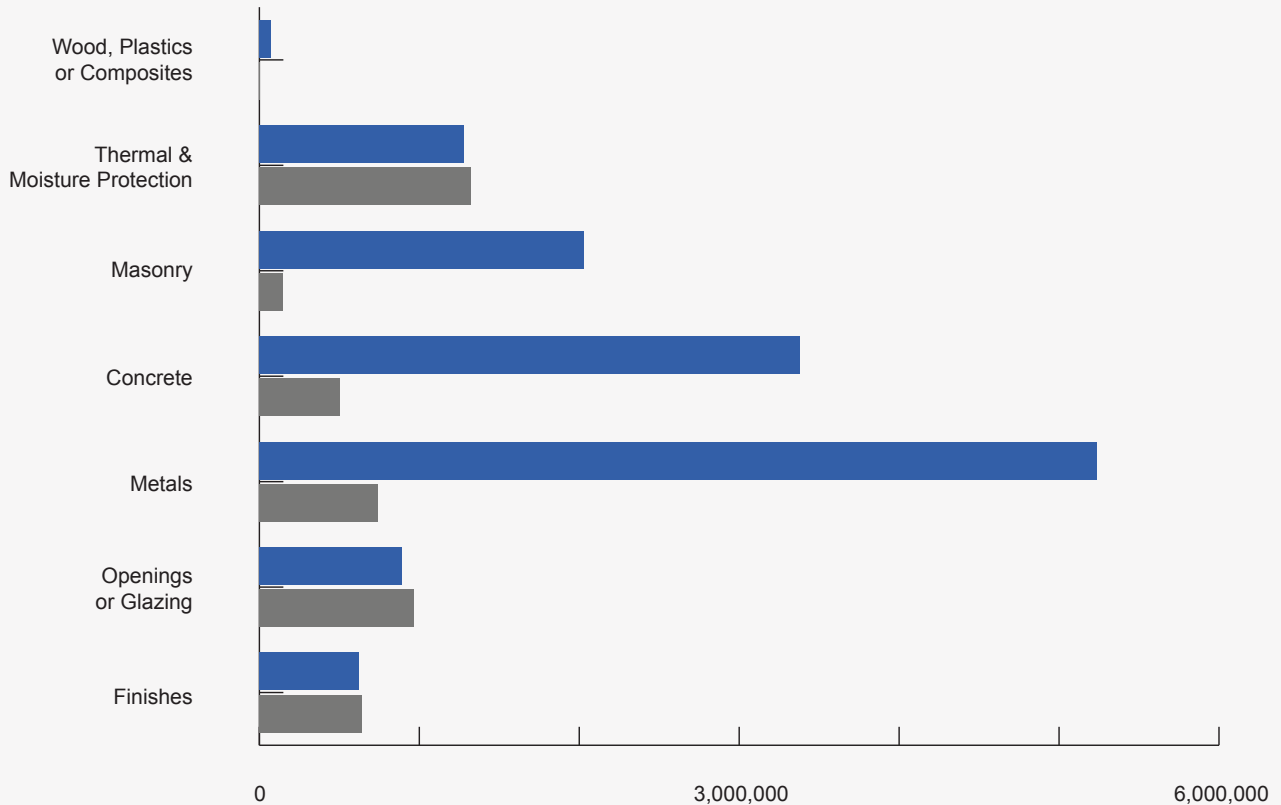


Exhibit II: The Link

Embodied Carbon Emissions (in Pounds of CO₂) — Renovation Project vs. New Construction

- New Construction
- Renovation Project



Source: Gensler²²

A specific example of the carbon savings refurbished properties can generate is provided by the global architecture firm, Gensler. As illustrated in Exhibit II, in Denver, Gensler successfully adapted “The Link,” a vacant 12-story 230,000 sf telecom building, into a modern mixed-use office property that includes ground level retail, a café, conference center, rooftop lounge, gym and contemporary building systems throughout the property. By renovating The Link instead of executing a new-build, Gensler was able to achieve embodied carbons savings of 68%.²¹

It is important to note that with refurbishments, renovations and other projects that improve and extend the life of an existing property, the carbon savings that are produced can differ depending on the types of materials that are used, waste disposal methods, and the property's design, function and location. To maximize both the embodied and operational carbon savings from these projects, the property should undergo a detailed energy audit that analyzes its ventilation and air intake systems, mechanical systems, lighting, insulation and other key components. After evaluating the audit's results, financial considerations, and design feasibility, a decision can be made regarding which components should be upgraded or replaced, with an eye towards items that produce the most carbon savings relative to their cost. Low-hanging fruit often includes installing solar panels and LED lighting, and reducing water usage by using low-flow fixtures. Environmentally friendly materials should also be used whenever possible. These include recycled plastic, wood, green concrete, recycled steel, cross-laminated timber and bio-insulation.

Additional components that should be considered during improvement projects include the following:

- Smart HVAC systems that use wireless technology to monitor and optimize energy usage.
- Smart sensors that detect occupancy and adjust lighting accordingly.
- Smart sensors that trigger maintenance alerts preventing more significant repairs and the use of additional resources.
- Smart windows that can adapt to exterior lighting conditions, block out light and cool interior spaces.
- Rainwater harvesting systems.

As improvements are being made, a robust recycling effort should also be made to offset the environmental impact caused by waste disposal.

By improving and extending the useful life of existing assets, property owners can generate meaningful carbon savings while mitigating their portfolios' transition risk at the same time. There is also a growing body of evidence indicating that carbon reducing CRE projects can help properties generate rent, revenue and sales price premiums.



Renovation and reuse projects typically save between 50% and 75% of the embodied carbon emissions compared to constructing a new building. This is especially true if the foundations and structure are preserved, since most embodied carbon resides there. With many projects, the first question should be, 'Is there an existing building we can use instead?'

— Larry Strain
The American Institute of Architects²³

Rent, Revenue & Sales Price Premiums



R Real estate surveys have shown that a growing number of CRE tenants, particularly for office and multifamily products, prefer “green” properties over other options.

Green properties are properties that have received a “green” certification from a recognized agency or organization. For example, the “Leadership in Energy and Efficient Design” or “LEED” certification that is issued by the U.S. Green Building Council. Increased tenant demand for green properties stems from different factors. Some tenants have a genuine desire to support sustainability efforts, other tenants might want specific amenities like energy efficient appliances, smart thermostats and smart windows; while another group of tenants could be attracted to green buildings because of the potential for lower energy bills. Regardless of the reasons some tenants prefer green properties to other options, surveys also show that these tenants are willing to pay higher rents to occupy greener properties. Higher rents and lower energy costs boost the property’s NOI, and the higher NOI combined with green properties’ ability to mitigate transition risk can result in higher valuations for green properties relative to similar properties that are not green-certified. To test these survey results and quantify the financial benefits of green properties, several studies on the existence of a green premium in the form of higher rents, occupancy or sale prices have been completed over the years. In 2018, an analysis of 42 of these studies was published in the Routledge Handbook of Sustainable Real Estate, which consolidates research from leading academics around the world. The studies in the analysis took place between 2008 and 2016, spanned 14 countries, and included both commercial and residential properties. Of the 42 studies, 39 reported a rent premium for green certified buildings and 38 reported a sales premium for green certified buildings.²⁴ The average rent premium for commercial properties was 5.4% and the average sales premium was 11.5%.²⁵ These findings are supported by additional studies from leading real estate firms.



For our part, we expect sustainability premiums to grow for multifamily assets, driven [by] access to preferential financing (from the GSE programs as well as private lenders), the increasing incorporation of sustainability frameworks within institutional investment portfolios, and ultimately, as sustainability features become more important, [by] differentiators to residents.

— Cushman & Wakefield³⁰

In another study, researchers at Cushman & Wakefield analyzed LEED-certified office buildings delivered between 2010 and 2020 and compared them to non-LEED-certified office buildings. After controlling the data for class segmentation and location, they found that since 2015, LEED-certified office properties earned an 11.1% rent premium over non-LEED-certified office properties, generated greater cash flow, and from 2018 to 2020, the average market sales price psf for LEED-certified office product was 21% higher than for non-LEED-certified office properties.²⁶ Cushman & Wakefield also analyzed LEED-certified multifamily properties in urban, gateway-plus markets and found that these properties earned a 3% rent premium over non-LEED-certified multifamily properties between 2000 and 2021, and that LEED-certified multifamily properties recorded a 9% sales premium over non-LEED-certified multifamily properties from 2000 to 2021.²⁷

In addition to Cushman & Wakefield's report, a CBRE study analyzing 20,000 U.S. office buildings found that after accounting for location, age, size, amenities and renovation history, LEED-certified buildings earned a 4% rent premium over non-LEED-certified buildings before the start of the COVID-19 global pandemic and a 3% premium after the onset of the pandemic.²⁸ The report states that the decline is likely temporary and reflects disruptions in the office market since the onset of COVID-19, including an overall decline in tenant demand for office product due to the proliferation of remote work arrangements since the start of the pandemic and the migrating of some businesses to suburban locations with fewer LEED-certified office buildings.

Reflecting investor demand for green properties, a CBRE survey of more than 500 CRE professionals worldwide found that 30% of respondents would pay a premium for a property that was refurbished, renovated or converted, instead of newly constructed; 45% would pay a premium for green certified properties and 35% would pay a premium for properties with energy reducing features.²⁹ Regarding non-green properties, 34% of respondents stated that they would either seek a discount or reject a property if it was not certified green and 49% stated that they would either seek a discount or reject a property if it did not include energy reducing features.

The ability of green properties to produce higher rents, lower energy costs, greater operating income and higher exit values than similar non-green properties illustrates the business case for investing in these assets. For property owners who wish to extend the useful life of properties in their portfolio or complete other green CRE projects, there are several financing options available to assist them.

73%

Of global investors either strongly agree or agree that green certifications drive higher occupancy, higher rents, higher tenant retention and value (25% strongly agree, 48% agree).³²

78%

Of global occupiers either currently prioritize green certifications in occupancy decisions (35%), or plan to do so by 2025 (43%).³¹



Green Financing



Green loans, green bonds, and PACE financing programs are three of the primary green financing options available for commercial properties.

As the urgency towards addressing climate change has grown in recent years, so too has the usage rate of these programs. For example, since the first green loan was issued in 2014, the total amount of green loans outstanding globally has grown from a few hundred million dollars to over \$30 billion.³³

Green Loans

Proceeds from green loans must be used for projects that contribute to an environmental objective and are considered “green eligible” by the lender. When determining if a project is green eligible, lenders typically turn to the Green Loan Principles established by the International Capital Markets Association (ICMA) as a guide. Examples of green eligible projects included in these principles are the following:

- The production or transmission of renewable energy.
- The construction, retrofitting, reuse or refurbishment of commercial or residential real estate, such that the property achieves green certification or a significant reduction in carbon emissions.
- The purchase of green vehicles – e.g., electric or hybrid vehicles.
- The purchase, repair or improvement of pollution prevention and control systems.
- The purchase, repair or improvement of sustainable water management systems.

Green loan borrowers must clearly communicate to the lender how funding will be used and either segregate the loan proceeds in a separate account or provide detailed reporting to ensure that proceeds are being used for the agreed upon purpose. The borrower must also provide reporting on the environmental impact of the project the loan is funding and some lenders may require this reporting be attested to by an independent, external party. Fannie Mae is an established provider of green loans in the U.S. and offers preferential pricing for these loans to eligible borrowers.³⁴

Green Bonds

Green bonds are another financing option for green CRE projects. These are debt securities that function like traditional bonds except they must be used for green projects that satisfy specific requirements. Similar to green loans, green bond issuers look to the Green Bond Principles established by the ICMA to determine which projects are eligible for bond issuance. Green bonds are often used to raise large amounts of capital for the borrower (e.g., at least \$25 million), who facilitates the marketing of these bonds to investors by publicly reporting how bond proceeds will be used. The best rates are available to borrowers with strong balance sheets and credit ratings. Accordingly, the most common green bond issuers are municipalities and publicly traded companies. Financial institutions that have been active in issuing green bonds include Bank of America, Citigroup and Hannon Armstrong. Additional firms that facilitate green bond financing can be found on the Department of Energy's website.

“As the regulatory and capital environment favors ESG, investment in green buildings proves valuable for landlords. Landlords who prioritize ESG at their properties can expect higher rent, tax credits and incentives, and overall higher market value for their real estate investments.”

— Ernst & Young³⁷

Similar to green loans, green bond issuers also produce reports at regular intervals detailing the use of proceeds and the progress that has been made towards achieving the borrower's stated objective. These reports are shared with investors and may also be made publicly available. The world's first green bond was issued in 2008 and the green bond market has grown steadily since then. In 2014, \$7 billion in green bonds was issued in the U.S., and by 2022, this figure had grown to \$51 billion.³⁵

Fannie Mae

With both green loan and green bond programs, Fannie Mae is an active participant in the green financing space. Depending on the program, the benefits of obtaining green financing through Fannie Mae can include additional loan proceeds, a lower interest rate, and a free energy and water audit report. Fannie Mae's financing is contingent upon the subject property having an approved green building certification. Fannie Mae currently recognizes 35 green building certifications from 12 organizations.

In addition to Fannie Mae's offerings, the federal government recently affirmed its commitment to green energy projects by including \$27 billion in the 2022 Inflation Reduction Act for a Greenhouse Gas Reduction Fund. The Fund will be used to finance projects that reduce greenhouse gas emissions, including real estate projects, particularly in low-income and disadvantaged communities.³⁶

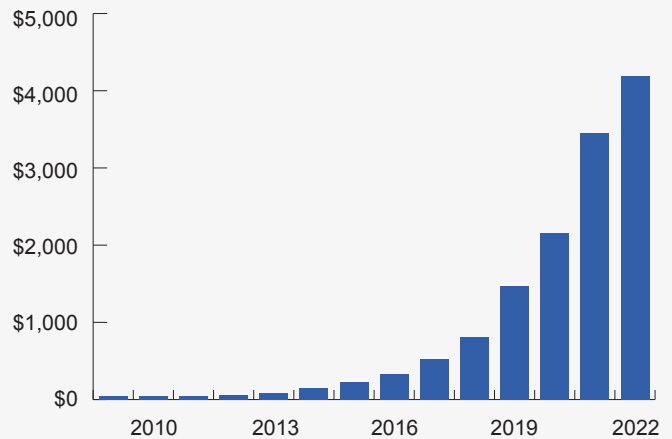


PACE Financing

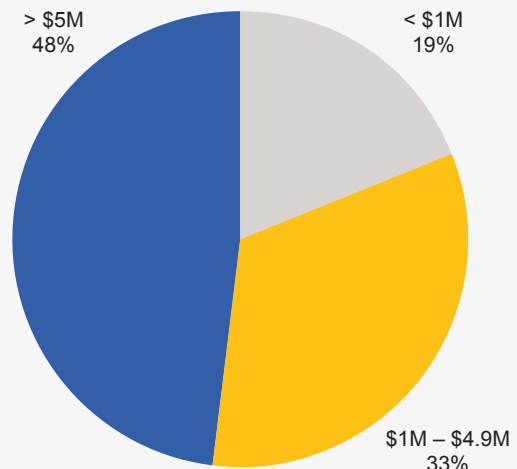
Property Assessed Clean Energy loans (PACE) are another common form of green financing. Within PACE, there are C-PACE loans for commercial entities and R-PACE loans for residential entities. C-PACE loans were created to fund energy efficient renovations and upgrades, such as solar panels, LED lighting, and energy efficient HVAC and water systems. Unlike conventional loans, C-PACE loans become an assessment on the underlying property and are paid annually with real estate taxes.

C-PACE liens are senior to all non-tax liens and because of this, C-PACE financing requires consent from the property's current lienholder. The loan is attached to the property and transfers to the new owner if the property is sold. In most jurisdictions, C-PACE loans cannot be accelerated and are non-recourse. C-PACE loans offer a 100% loan to value ratio, allowing for 100% financing of eligible projects and the loan repayment period is usually 15 to 20 years, but depending on the useful life of the improvements that are being funded, the repayment period can be as long as 30 years.³⁸ The number of C-PACE loans outstanding has grown considerably since the C-PACE program was created in 2009 and \$40 million in loan proceeds were issued that year. Since 2010, more than \$4 billion in additional C-PACE loans have been issued.³⁹ Thirty states and Washington D.C. have active C-PACE programs.⁴⁰

Cumulative C-PACE Investments (in Millions)



C-PACE Percentage of Investments (by Dollar Amount)



Conclusion



Carbon emissions from human activities are contributing to changes in the Earth's climate that are causing significant property and economic losses, and the loss of life in many cases.

Governments, businesses and organizations have recognized the threats posed by climate change and are increasingly working to mitigate them by reducing carbon emissions. The built environment's large carbon footprint gives the commercial real estate community an opportunity to support these efforts in a meaningful way. By limiting or reducing carbon emissions produced by buildings, real estate investors, owners and operators can contribute to global carbon reduction efforts, protect their portfolios from climate risk and position themselves to benefit financially from the higher rents, NOI and sales premiums that green properties can command.

Endnotes

- 1 Epa.gov. <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>
- 2 Epa.gov. <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>; Whitehouse.gov. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/12/07/fact-sheet-biden-harris-administration-announces-first-ever-federal-building-performance-standard-catalyzes-american-innovation-to-lower-energy-costs-save-taxpayer-dollars-and-cut-emissions/>
- 3 Embodied Carbon Assessment” CircularEcology.com. <https://circularecology.com/embodied-carbon.html>
- 4 “2018 Commercial Buildings Energy Consumption Survey, Consumptions and Expenditures Highlights.” U.S. EIA. <https://www.eia.gov/consumption/commercial/>
- 5 “Aon, 2023 Weather, Climate and Catastrophe Insight.” <https://www.aon.com/weather-climate-catastrophe/index.aspx>
- 6 “Aon, 2023 Weather, Climate and Catastrophe Insight.” <https://www.aon.com/weather-climate-catastrophe/index.aspx>
- 7 Yardi Matrix. “Mounting Insurance Premiums Vex Property Owners in Climate-Risk States.” February 2023.
- 8 “Aon, 2023 Weather, Climate and Catastrophe Insight.” <https://www.aon.com/weather-climate-catastrophe/index.aspx>
- 9 The 40% and 80% reductions are from a 2005 baseline
- 10 “What is an Emission Factor.” ClimatIQ. <https://www.climatiq.io/docs/guides/what-is-an-emission-factor>
- 11 Examples of building emissions measurement tools include the EPA’s ENERGY STAR Portfolio Manager and the Urban Green Council’s Metered website. The following is an example of an emissions factor calculation: The emissions factor for customer use of natural gas is 11.7 lbs of CO2 per therm. Assuming the emissions factor increases to 13.446 lbs of CO2 after adjusting it to account for distribution from the utility company to the building, if the building consumes 500 therms of natural gas per day, then its daily CO2 emissions from natural gas is 6,723 lbs of CO2 (i.e., 500 X 13.446). The adjusted 13.446 emissions factor is sourced from Pacific Gas & Electric’s ClimateSmart program.
- 12 “New York City Buildings.” NewYork.gov. <https://www.nyc.gov/site/buildings/codes/greenhouse-gas-emission-reporting.page>.
- 13 “What is Local Law 97.” Urban Green Council. <https://www.urbangreencouncil.org/what-we-do/driving-innovative-policy/ll97/>
- 14 Webber, Maura. “Five U.S. Cities Target Building Energy Use, Emissions with Fines.” 29 November 2022. <https://www.cfodive.com/news/five-us-cities-target-building-energy-use-emissions-fines/637538/>
- 15 Markolf, Sam, et al. “Pledges and progress: Steps toward greenhouse gas emissions reductions in the 100 largest cities across the United States.” <https://www.brookings.edu/research/pledges-and-progress-steps-toward-greenhouse-gas-emissions-reductions-in-the-100-largest-cities-across-the-united-states/>; “U.S. State Greenhouse Gas Emissions Targets.” C2es.org. <https://www.c2es.org/document/greenhouse-gas-emissions-targets/>
- 16 Whitehouse.gov. <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/08/executive-order-on-catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability/>
- 17 Yardi Matrix. “Mounting Insurance Premiums Vex Property Owners in Climate-Risk States.” February 2023.
- 18 Tobias, Michael. “How the Empire State Building Cut its Emissions by 54%.” 5 July 2022. <https://www.ny-engineers.com/blog/how-the-empire-state-building-cut-its-emissions-by-54>
- 19 “The Greenest Building: Quantifying the Environmental Value of Building Reuse.” Preservation Green Lab, National Trust for Historic Preservation. <https://forum.savingplaces.org/viewdocument/the-greenest-building-quantifying>
- 20 “The Greenest Building: Quantifying the Environmental Value of Building Reuse.” Preservation Green Lab, National Trust for Historic Preservation. <https://forum.savingplaces.org/viewdocument/the-greenest-building-quantifying>
- 21 Garrison, Alex. “The Case for Adaptive Reuse: How The Link Drive Sustainable Design Strategies in Downtown Denver. 1 November 2021. <https://www.gensler.com/blog/the-link-adaptive-reuse-sustainable-design-downtown-denver>
- 22 Garrison, Alex. “The Case for Adaptive Reuse: How The Link Drive Sustainable Design Strategies in Downtown Denver. 1 November 2021. <https://www.gensler.com/blog/the-link-adaptive-reuse-sustainable-design-downtown-denver>
- 23 Strain, Larry. “10 Steps to Reducing Embodied Carbon.” <https://www.aia.org/articles/70446-ten-steps-to-reducing-embodied-carbon>
- 24 JLL. “Return on Sustainability. How the ‘Value of Green’ Conversation is Growing Up.” January 2022.
- 25 JLL. “Return on Sustainability. How the ‘Value of Green’ Conversation is Growing Up.” January 2022.
- 26 Cushman & Wakefield. “Green is Good: Sustainable Office Outperforms in Class A Urban Markets.” August 2021.
- 27 Cushman & Wakefield. “Green is Good Part 3: Sustainability’s Impact on Multifamily Performance.” March 2022.
- 28 CBRE. “Green is Good: The Enduring Rent Premium of LEED-Certified U.S. Office Buildings” 26 October 2022.
- 29 CBRE. “Strengthening Value Through ESG.” 28 February 2023.
- 30 Cushman & Wakefield. “Green is Good Part 3: Sustainability’s Impact on Multifamily Performance.” March 2022.
- 31 JLL. “Decarbonizing the Built Environment.” June 2021.
- 32 JLL. “Decarbonizing the Built Environment.” June 2021.
- 33 “What You Need to Know About Green Loans.” 4 October 2021.
- 34 “Follow the Path to Green Financing.” FannieMae.com. <https://multifamily.fanniemae.com/financing-options/specialty-financing/green-financing/green-financing-loans>
- 35 Climate Bonds Initiative. <https://www.climatebonds.net/market/data/>; “Global Green Bond Issuance Poised for Rebound in 2023 Amid Policy Push.” S&P Global Market Intelligence. 25 January 2023. <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/global-green-bond-issuance-poised-for-rebound-in-2023-amid-policy-push-73931433>
- 36 “About the Greenhouse Gas Reduction Fund.” Epa.gov. <https://www.epa.gov/greenhouse-gas-reduction-fund/about-greenhouse-gas-reduction-fund>
- 37 Johnson, Brett, et al. “Looking at ESG’s Positive Impact on Real Estate Values.” Ernst & Young. 11 November 2022. https://www.ey.com/en_us/real-estate-hospitality-construction/looking-at-esg-s-positive-impact-on-property-values
- 38 “Better Buildings Financing Navigator.” United States Department of Energy. <https://betterbuildingsolutioncenter.energy.gov/financing-navigator/option/cpace>
- 39 PACENation.org. <https://www.pacenation.org/pace-market-data/>
- 40 “Commercial Property Assessed Clean Energy.” Epa.gov. <https://www.epa.gov/statelocalenergy/commercial-property-assessed-clean-energy>.
- 41 PACENation.org. <https://www.pacenation.org/pace-market-data/>



Disclosures

The information contained in this report was obtained from sources deemed to be reliable. Every effort was made to obtain accurate and complete information; however, no representation, warranty or guaranty, express or implied, may be made as to the accuracy or reliability of the information contained herein. This is not intended to be a forecast of future events and this is not a guaranty regarding a future event. This is not intended to provide specific investment advice and should not be considered as investment advice.

For Additional Information

Debo Ayeni

Director of Research and Data Analytics

debo.ayeni@abrcapital.com | 410.547.3032

ABR Capital Partners

300 East Lombard Street, Suite 1200

Baltimore, MD 21202

abrcapital.com | 410.727.4083

© 2023 ABR Capital Partners. All rights reserved.

June 2023