

Real Estate Practice

Climate risk and the opportunity for real estate

Real-estate leaders should revalue assets, decarbonize, and create new business opportunities. Here's how.

by Brodie Boland, Cindy Levy, Rob Palter, and Daniel Stephens



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Climate change, previously a relatively peripheral concern for many real-estate players, has moved to the top of the agenda. Recently, investors made net-zero commitments, regulators developed reporting standards, governments passed laws targeting emissions, employees demanded action, and tenants demanded more sustainable buildings. At the same time, the accelerating physical consequences of a changing climate are becoming more pronounced as communities face storms, floods, fires, extreme heat, and other risks.

These changes have brought a sense of urgency to the critical role of real-estate leaders in the climate transition, the period until 2050 during which the world will feel both the physical effects of climate change and the economic, social, and regulatory changes necessary to decarbonize. The climate transition not only creates new responsibilities for real-estate players to both revalue and future-proof their portfolios but also brings opportunities to create fresh sources of value.

The combination of this economic transition and the physical risks of climate change has created a significant risk of mispricing real estate across markets and asset classes. For example, a major North American bank conducted analysis that found dozens of assets in its real-estate portfolio that would likely be exposed to significant devaluations within the next ten years due to factors including increased rates of flooding and job losses due to the climate transition. Additionally, a study of a diversified equity portfolio found that, absent mitigating actions, climate risks could reduce annual returns toward the end of the decade by as much as 40 percent.

Leading real-estate players will figure out which of their assets are mispriced and in what direction and use this insight to inform their investment, asset management, and disposition choices. They will also decarbonize their assets, attracting the trillions of dollars of capital that has been committed to net zero and the thousands of

tenants that have made similar commitments. They will then create new revenue sources related to the climate transition.

Building climate intelligence is central to value creation and strategic differentiation in the real-estate industry. But the reverse is also true: real estate is central to global climate change mitigation efforts. Real estate drives approximately 39 percent of total global emissions. Approximately 11 percent of these emissions are generated by manufacturing materials used in buildings (including steel and cement), while the rest is emitted from buildings themselves and by generating the energy that powers buildings.¹

In addition to the scale of its contribution to total emissions, real estate is critical in global decarbonization efforts for reasons likely to be compelling for investors, tenants, and governments. Significant reductions in emissions associated with real estate can be achieved with positive economics through technologies that already exist. For example, upgrading to more energy-efficient lighting systems and installing better insulation have positive financial returns. Today, newer technologies also make low-carbon heating and cooling systems, such as heat pumps and energy-efficient air conditioning, more cost competitive in many markets and climates. These cost-effective upgrades can create meaningful change while also derisking assets.

We suggest three actions real-estate players can take to thrive throughout the climate transition:

- Incorporate climate change risks into asset and portfolio valuations. This requires building the analytical capabilities to understand both direct and indirect physical and transition risks.
- Decarbonize real-estate assets and portfolios.
- Create new sources of value and revenue streams for investors, tenants, and communities.

¹ 2019 global status report for buildings and construction, International Energy Agency, December 2019.

Fundamental changes brought on by the climate transition will open new dimensions of competitive differentiation and value creation for real-estate players. More important, leaders will make a valuable contribution to the world's ability to meet the global climate challenge.

Incorporate climate change risks into asset and portfolio valuations

Climate change's physical and transition risks touch almost every aspect of a building's operations and value. Physical risks are hazards caused by a changing climate, including both acute events, such as floods, fires, extreme heat, and storms, and chronic conditions, such as steadily rising sea levels and changing average temperatures. Transition risks include changes in the economy, regulation, consumer behavior, technology, and other human responses to climate change.

Physical and transition risks can affect assets, such as buildings, directly or indirectly, by having an impact on the markets with which the assets interact. A carbon-intensive building obviously faces regulatory, tenancy, investor, and other risks; over the long term, so does a building that exists in a carbon-intensive ecosystem. For example, a

building supplied by a carbon-intensive energy grid or a carbon-intensive transportation system is exposed to the transition risks of those systems as well. All these changes add up to substantial valuation impacts for even diversified portfolios—an increasingly pressing concern for real-estate companies (see sidebar, “We do mind the gap”).

Physical risks, both direct and indirect, have an uneven effect on asset performance

Several major real-estate companies have recently conducted climate stress tests on their portfolios and found a significant impact on portfolio value, with potential losses for some debt portfolios doubling over the next several years. Notably, they found significant variation within the portfolios. Some assets, because of their carbon footprint, location, or tenant composition, would benefit from changes brought on by the climate transition, while others would suffer significant drops in value. The challenge for players is to determine which assets will be affected, in what ways, and how to respond. There is also opportunity for investors who can identify mispriced assets.

Direct physical consequences can be conspicuous: the value of homes in Florida exposed to changing climate-related risks are depressed by roughly

We do mind the gap

As we work with real-estate firms, we notice that investment teams increasingly recognize the impact of climate change on asset values. As one leader of valuations at a major real-estate-services firm recently commented to us: “This is the greatest deviation between modeled valuation and actual price that I’ve ever seen, and it’s because of climate.” A chief operating officer of a diversified real-estate investor told us, “We’ve seen underperformance

of a cluster of our assets due to climate-related factors that just weren’t considered in our investment theses.”

The industry at large senses how values are shifting. A recent survey of finance experts and professionals conducted by researchers at New York University found that those who think real-estate asset prices reflect climate risks “not enough” outnumber those who think they reflect

climate risks “too much” by 67 to 1 (in comparison with stock prices, in which the ratio was 20 to 1).¹ The International Renewable Energy Agency has estimated that \$7.5 trillion worth of real estate could be “stranded”; these are assets that will experience major write-downs in value given climate risks and the economic transition, making real estate one of the hardest-hit sectors.²

¹ Johannes Stroebe and Jeffrey Wurgler, “What do you think about climate finance?,” Harvard Law School Forum on Corporate Governance, September 3, 2021.

² Jean Eaglesham and Vipal Monga, “Trillions in assets may be left stranded as companies address climate change,” *Wall Street Journal*, November 20, 2021.

\$5 billion relative to unexposed homes. According to the *Journal of Urban Economics*, after Hurricane Sandy, housing prices were reduced by up to 8 percent in New York's flood zones by 2017, reflecting a greater perception of risk by potential buyers.² In California, there has been a 61 percent annual jump in nonrenewals of insurance (due to higher prices and refused coverage) in areas of moderate-to-very-high fire risk.³

The indirect impacts of physical risk on assets can be harder to perceive, causing some real-estate players to underestimate them. For example, in 2020, the McKinsey Global Institute modeled expected changes in flooding due to climate change in Bristol, England. A cluster of major corporate headquarters was not directly affected, but the transportation arteries to and from the area were. The water may never enter the lobby of the building, but neither will the tenants.

The climate transition will affect both individual buildings and entire real-estate markets

The investments required to avoid or derisk the worst physical risks will drive a historic reallocation of capital. This will change the structure of our economy and impact the value of the markets, companies, and companies' locations. These momentous changes require real-estate players to look ahead for regulatory, economic, and social changes that could impact assets.

Among the most direct climate-transition impacts are regulatory requirements to decarbonize buildings, such as New York City's Local Law 97. In June 2019, the Urban Green Council found that retrofitting all 50,000 buildings covered by the law would create retrofit demand of up to \$24.3 billion through 2030.⁴ Standard property valuation models generally do not account for the capital costs required for a building to decarbonize, and

investors and operators are often left with a major capital expense or tax that wasn't considered in the investment memo.

There is also a host of less direct but potentially more significant transition risks that affect whole markets. For example, some carbon-intensive industries are already experiencing rapid declines or fluctuations. In Calgary, for example, the combination of oil price volatility and market-access issues (driven by climate change-related opposition to pipelines) has dramatically depressed revenues from some buildings. Vacancy rates in downtown Calgary reached about 30 percent, a record high, as of January 2021. Investors exposed to the Calgary market have seen their asset values drop precipitously and are left trying to either hold on and hope for a reversal of fortunes or exit the assets and take a significant loss.

Real-estate players should build the capabilities to understand climate-related impacts on asset performance and values

Real-estate owners and investors will need to improve their climate intelligence to understand the potential impact of revenue, operating costs, capital costs, and capitalization rate on assets. This includes developing the analytical capabilities to consistently assess both physical and transition risks. Analyses should encompass both direct effects on assets and indirect effects on the markets, systems, and societies with which assets interact (Exhibit 1).

Portfolio and asset managers can map, quantify, and forecast climate change's asset value impact

To understand climate change impact on asset values, landlords and investors can develop the following capabilities to understand and quantify risks and opportunities:

²Francesc Ortega and Süleyman Taşpinar, "Rising sea levels and sinking property values: Hurricane Sandy and New York's housing market," *Journal of Urban Economics*, July 2018, Volume 106.

³Elaine Chen and Katherine Chiglinsky, "Many Californians being left without homeowners insurance due to wildfire risk," *Insurance Journal*, December 4, 2020.

⁴Justin Gerdes, "After pandemic, New York's buildings face daunting decarbonization mandate," *Greentech Media*, April 23, 2020.

Exhibit 1

Physical and transition risks have direct and indirect implications for revenue, operating and capital costs, and capitalization rate.

Implications of transition and physical risks, by direct and indirect effects				
	Transition risks Include changes in the economy, regulation, consumer behavior, technology, and other human responses to climate change		Physical risks Hazards caused by a changing climate, from floods, fires, and storms to rising sea levels and changing average temperatures	
	 Direct effect	 Indirect effect	 Direct effect	 Indirect effect
Revenue	Unattractiveness of a carbon-intensive asset to an occupier that has made a climate commitment	Decline in a sector or local economy resulting in lower local real-estate demand/occupancy	Disruptions to an asset's operations from severe or repeated physical-hazard events (eg, major floods)	Reduced real-estate demand in a local market given disruptions to surrounding transportation or other infrastructure
Operating costs	Increased utility costs given carbon-intensive building systems	Carbon charges on an asset given local regulations	Increased maintenance costs as physical risks increase	Increased insurance costs as insurers recognize physical risks and adjust underwriting models
Capital costs	Significant capital investment required to meet local energy efficiency/emissions standards or tenant demands (eg, early retrofit of heating/cooling systems), increased need to purchase lower-emissions building materials (eg, steel, cement, timber)	Increased financing costs as investors and lenders price in market-level transition risks (eg, in economies dependent upon carbon-intensive industries)	Investment required to improve the resilience of building to increasing physical risks (eg, elevating lobby, green roofs, protecting electric and mechanical systems)	Increased capital investments (eg, development fees) required to protect broader communities from climate risks (eg, floodwalls, green infrastructure for heat mitigation)
Capitalization rate	Changes in capitalization rate due to perceptions of both physical and transition risks by market participants			

- **Prioritize.** Create a detailed assessment of the asset or portfolio to determine which physical and transition risks are most important and which are less important (using criteria such as the probability of a risk occurring or the severity of that risk).
- **Map building exposures.** Determine which buildings are exposed to risks, either directly (for example, having to pay a carbon tax on building emissions) or indirectly (for example, exposure to reduction in occupancy as tenants' industries decline because of a carbon tax), and the degree

of exposure (for example, how high floodwaters would reach). This could require detailed modeling of physical hazards (for example, projected changes in flood risks as the climate changes) or macro- or microeconomic modeling (for example, projected GDP impacts based on the carbon price impact on a local geography's energy production mix).

- **Quantify portfolio impact.** Combine assessments of the economic risks on individual buildings into an impact map that enables visualization of the entire portfolio (Exhibit 2). This requires combining knowledge of the potential risk or opportunity and an understanding of what drives the economics of a building (including drivers of net operating income, tenancy mix, and areas of cost variability).
- **Take action.** These capabilities cannot be isolated in a research or environmental, social, and governance (ESG) function but should

directly inform investment management, lease pricing, capital attraction and investor relations, asset management, tenant attraction, development, and other core businesses. The processes within organizations must shift to ensure that climate-related insights can be a source of real competitive advantage.

A portfolio revaluation informed by climate change risks can lead to hard choices but will also open the door to acting on decarbonization and exploring new opportunities.

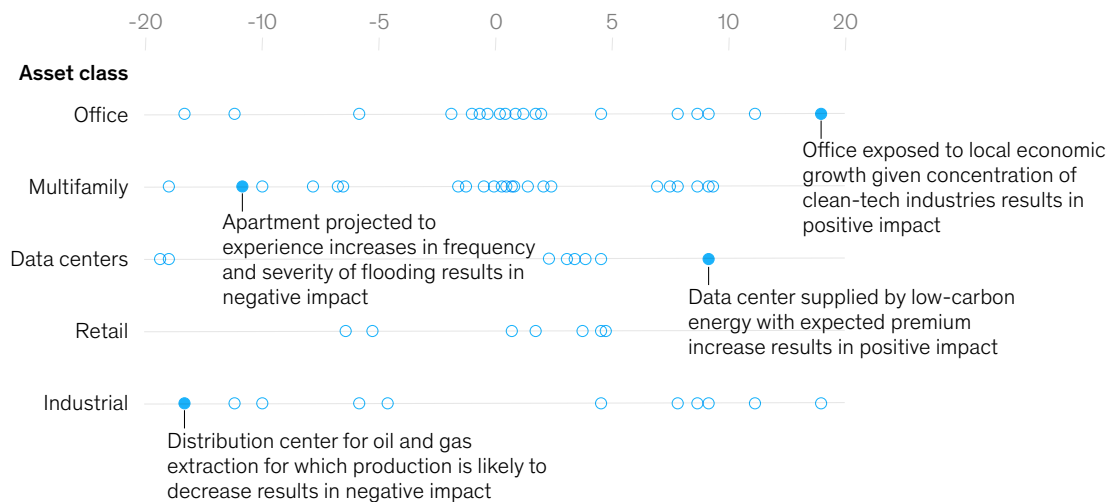
Decarbonize buildings and portfolios

McKinsey research estimates approximately \$9.2 trillion in annual investment will be required globally to support the net-zero transition. If the world successfully decarbonizes, the 2050 economy will look fundamentally different from the current economy. If it doesn't successfully decarbonize, the world will experience mounting

Exhibit 2

Real-estate owners and investors can assess the effects of physical risks and climate transition on the equity value of assets in a diversified real-estate portfolio.

Illustrative chart and examples of physical and transition risk effects on equity value of assets, %



physical risks that will strain the foundations of the global economy and society. In either case, the places where people live, work, shop, and play will fundamentally change.

Decarbonizing real estate requires considering a building's ecosystem

Ultimately, the only way to reduce the risks of climate change is to decarbonize. Real-estate players have a wide array of options for how to proceed, including low-carbon development and construction; building retrofits to improve energy efficiency; upgrades to heating, cooling, and lighting technology; and technology to manage demand and consumption. But decarbonization is not solely a technical challenge. To develop the most appropriate path, real-estate players need to understand the range of decarbonization options and their financial and strategic costs and benefits.

Decarbonizing real estate

To decarbonize, industry players can take the following steps:

- *Understand the starting point.* Quantify baseline emissions of each building. This helps real-estate players prioritize where to start (for example, individual buildings, asset classes, or regions) and determine how far there is to go to reach zero emissions.
- *Set targets.* Decide which type of decarbonization target to set. There is a range of potential target-setting standards that take different approaches (for example, measuring absolute emissions versus emissions intensity, or setting targets at the sector level versus asset level). Players should develop a “house view” on targets that achieve business, investor, stakeholder, regulatory, and other objectives.
- *Identify decarbonization levers.* Build an asset- or portfolio-level abatement curve. A marginal abatement cost curve provides a clear view of the potential cost/return on investment of a given emissions-reduction lever along with the impact of that lever on emissions reduction.

This approach can be complemented with market and policy scenarios that change the relative costs and benefits of each potential abatement lever.

- *Execute.* Set up the mechanisms to effectively deploy the decarbonization plan. These may involve making changes to financing and governance, stakeholder engagement (investors, joint-venture partners, operators, and tenants), and a range of operational and risk-management aspects of the business.
- *Track and improve.* As investors, lenders, and tenants make their own decarbonization commitments, they will need to demonstrate that their real estate is indeed decarbonizing. Thus, much of the value of decarbonizing will come from the ability to demonstrate emissions reduction to potential stakeholders. Building the ability to monitor and progressively reduce emissions on the path to net zero will create an opportunity for players to differentiate.

Create new sources of value and revenue streams for investors, tenants, and communities

As the economy decarbonizes, real-estate players can use their locations, connections to utility systems, local operational footprints, and climate intelligence to create new revenue streams, improve asset values, or launch entirely new businesses.

Opportunities include the following:

- *Local energy generation and storage.* Real-estate firms can use their physical presence to generate and store energy. For example, property developers have been outfitting buildings with solar arrays and batteries, helping to stabilize energy grids and reduce the costs associated with clean energy.⁵
- *Green buildings to attract more tenants.* Developers and property managers can invest in developing green buildings or retrofitting

older buildings to make them green to meet the growing appetite for sustainable workplaces and homes.

- **Green-building materials.** Players can explore the advantages of green steel, tall timber, modular construction, and other emerging technologies and materials that may have additional benefits, such as faster and lower-cost construction.
- **Extra services on-site.** Firms can introduce new revenue streams, including vehicle charging, green-facilities management, and other on-site services that enable occupants' sustainable preferences.
- **Services for reducing and tracking emissions.** Firms can support occupants by tracking emissions and offering solutions to reduce carbon footprints. These services could include smart sensors and tracking energy consumption through heating, cooling, lighting, and space management.
- **Differentiated capital attraction.** Given the volume of capital that has already been

committed to achieving net zero, firms that are able to decarbonize will have an advantage in attracting capital. Real-estate players may, for example, create specific funds for net-zero buildings or investment themes that support community-scale decarbonization.

The coming climate transition will create seismic shifts in the real-estate industry, changing tenants' and investors' demands, the value of individual assets, and the fundamental approaches to developing and operating real estate. Smart players will get ahead of these changes and build climate intelligence early by understanding the implications for asset values, finding opportunities to decarbonize, and creating opportunity through supporting the transition.

Real estate not only will play a critical role in determining whether the world successfully decarbonizes but also will continue to reinvent the way we live, work, and play through these profound physical and economic changes.

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⁵"5 ways clean tech is making commercial RE more energy efficient," Jones Lang LaSalle, April 20, 2021.