# Assessing climate-related risk & resiliency

**The reality of extreme weather events requires a proactive approach to quantifying and mitigating risk, with resilience strategies identified during due diligence and implemented upon acquisition.**

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Hurricanes on the East Coast. Wildfires in the West. Record temperatures and consecutive storm events throughout the country. Extreme weather events each year result in billions of dollars of damage and even deaths. The Federal Reserve Board of Governors noted in March 2021 that climate change can result in "direct financial risks, prompting a reassessment of asset values, changing the cost or availability of credit, or affecting the timing or reliability of cash flows."[1]

Regardless of market, commercial real estate owners and investors face growing risk from climate-related events and extreme weather. They must understand and quantify asset and portfolio exposure to climate-related risk and evaluate and adopt mitigation strategies to address it. The best time to begin this process is during pre-acquisition due diligence, when climate risk data can be used to improve capital planning, building resiliency and long-term positioning.

## Accurate assessments, actionable data

Climate risk assessments (also known as resiliency assessments) are gaining traction in the commercial real estate community. Many providers rely on geographic data, such as national and local weather databases, flood maps and spaghetti models that combine AI with machine learning and other historic metrics to understand a property's exposure to risks from climate change and natural disasters. Unfortunately, this generalized, regional type of assessment often paints an incomplete picture.

To accurately evaluate the resiliency of a property — that is, its ability to withstand and resume normal functions after an extreme weather event — it is imperative to marry geographic data (as above) with site-specific data. An on-site assessment can identify building characteristics that will affect performance during climate events. For example, a property may not be in a

[1] Federal Reserve Board of Governors, Climate Change and Financial Stability, March 19, 2021.

flood zone according to regional flood maps, but a site assessment will reveal water damage consistent with flooding; perhaps that flood plain is protected by a levee that has been documented as suspect, or a stormwater system is long past its expected useful life.

A recent assessment of a New Jersey warehouse revealed the opposite scenario: a database review located the property in a flood zone, but the development of this particular site provided enough elevation to protect structures — so no costly mitigation measures were required. A look at the local watershed and supporting stormwater system will convey valuable information that would be overlooked if the assessment relied only on the FEMA Flood Insurance Rate Map (FIRM) panel number.

Because site-specific data is critical to accurately assess a property's climate risk exposure, the ideal time to perform a climate risk/resiliency assessment is prior to acquisition, during the property condition assessment (PCA). PCA and specialty assessors will already be on-site, gathering building data. Adjusting the scope of the PCA to include climate risk and resiliency observations saves time and money and minimizes disruption to building occupiers. For acquisitions in areas with known climate risk such as localized flooding or wildfire issues, combining a resiliency assessment with a PCA can also result in a more accurate valuation, as standard due diligence could fail to capture climate risk factors that could be detrimental to asset value.

In addition, assessing climate risk before acquisition allows for early identification and implementation of low-cost mitigation strategies. In some cases, simple and inexpensive measures can

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offset significant risk. Take, for example, rooftop equipment on buildings located in the Southeastern US, where hurricane risk is great. Hurricane damage to rooftop equipment is costly, but the greater exposure is liability for equipment blown off the roof during a storm. Installing a $100 strap on rooftop equipment of these buildings greatly reduces the risk for what could easily be hundreds of thousands of dollars in liability. For properties with high fire risk, installing ember guards in attic and eave vents is another low-cost measure that can have an outsized value in preventing fire damage. Early resiliency planning also allows for a phased approach, such as the relocation of mechanical equipment to a higher elevation. With the foresight of PCA data, the relocation of mechanical equipment that is slated for replacement can be done at the end of its expected useful life with minimal increases to capital expenditure.

In cases where climate risk exposure warrants capital outlay to mitigate risk, assessing climate risk during the PCA allows investors to incorporate mitigation into their capital plan. The standard scope of a PCA provides a 'like-for-like' approach to replacement reserves. In other words, if an HVAC unit will require replacement during the term addressed by the PCA, the replacement reserve table in a standard PCA will reflect the cost of replacing it with a similar system. However, for the acquisition of an office or multifamily property in the Southwestern US where average annual temperatures are rising, it would make sense to upgrade the HVAC system at the end of its useful life to one that can accommodate hotter temperatures and is more efficient than the unit it replaced. A PCA that incorporates climate risk assessment can capture measures such as these in the capital planning table.

Beyond immediate risk mitigation and improved capital planning, there is another argument for assessing resiliency during the PCA: marketing. Investors are increasingly concerned with sustainability and ESG metrics. Because resiliency planning makes buildings greener and safer, adding a resiliency review to the PCA can improve a property's GRESB score, an ESG benchmark for commercial real estate assets. By gathering climate risk data during pre-acquisition due diligence, portfolio managers can fine-tune properties as they onboard them, keeping their whole portfolio green.

## How much can we know? How well can we prepare?

Climate risk assessments are a bit like medical diagnostics: they can be used for prognosis but are much more valuable when they change the course of treatment. Knowing the rate of sea level rise or temperature change is only useful if it triggers a change in strategy.

## Climate risk/resiliency assessments

Whether as a stand-alone service or in the context of a comprehensive property condition assessment, climate risk/resiliency assessments evaluate the ability of a facility to withstand and recover from the impacts of external forces such as natural disasters and extreme weather events.

During the assessment, a qualified consultant will utilize the property's historical data and regional climate data to identify risks from climate change, natural disasters and man-made impacts. They will also perform an on-site evaluation of site-specific characteristics that affect the building's performance in the context of these risks. Then, considering the specific client's risk tolerance and investment objective, the consultant will issue a report containing an inventory of potential risks, list of property specific recommendations for risk mitigation measures, and cost and savings calculations.

Below are examples of factors that may be identified during a climate risk/resiliency assessment along with examples of typical mitigation measures for each.

| Risk factor | Mitigation measure example |
|---|---|
| High winds | • Install fasteners on all rooftop equipment to prevent lift during high winds.<br>• Replace windows with impact resistant glass. |
| Wildfire | • Remove dead and dry plant material from site. Install wildfire control lines (vegetation clearings).<br>• Install a wildfire defense system (may include water tanks and/or fire suppression foam/gels). |
| Hail | • Install hail guard on rooftop HVAC equipment to prevent hail damage. |
| Precipitation and storms | • Install risers to lift mechanical equipment a minimum of 18 inches above grade, preventing water inundation in a flooding situation.<br>• Regrade parking area to provide a minimum of 2% slope away from building foundation.<br>• Upsize catch basins and stormwater drainage system to accommodate 15% to 30% more storm water volume. |
| Sea-level rise | • Install permanent flooding barriers at perimeter of site to surge waters.<br>• Stockpile additional temporary water barriers, such as concrete barriers and/or sandbags for acute flooding events.<br>• Relocate energy generators and mechanical equipment from basement to above grade location. |
| Earthquake | • For buildings with tuck-under car ports, complete seismic assessment to determine ability to withstand earthquake; seismic retrofitting may be necessary. |
| Air quality | • Install minimum MERV 14 air filters and/or HEPA filters.<br>• Install UV-C duct/air disinfection system, increase outside air exchange rate. |
| Extreme temperatures | • Complete energy efficiency audit and retro commissioning to identify opportunities to reduce energy demand and mitigate peak demand.<br>• Install cool roof.<br>• Install building automation system (BAS) and optimize sequence of operations.<br>• Topcoat parking lot with high solar reflectance index (SRI)/light-colored coating to reduce heat island effect. |

*Source:* Partner Energy.

Pragmatic real estate investors don't want doomsday scenarios; they want data to inform planning. Climate science, however, is a relatively new field of study with limited data and almost unlimited variables: What can we predict, and with what degree of accuracy? We have seen the frequency of extreme weather events increasing in recent years and mainstream investors, along with their insurance companies, are noticing.

Unlike with PCAs and environmental site assessments, there is no ASTM standard for climate risk/resiliency assessments. Depending on the location of an asset, a climate risk assessment may incorporate any number of risk factors including hurricanes, fire, drought, volcanic activity, air quality, temperature change, wind events, flooding and sea level rise, earthquakes, precipitation/storms, and landslides. Scopes can be customized to incorporate anticipated hold times or individual risk tolerance. Some investors prefer to focus on factors that a resiliency assessment can identify with a degree of certainty. Others seek to understand their exposure in a broader range of possibilities. Generally, a resiliency assessment will present a range of scenarios (best, worst, moderate), along with mitigation options.

Rarely do the findings of a climate risk assessment make or break an acquisition; rather, the data allows would-be owners to explore scenarios and weigh risk against the cost of mitigation. Particularly for institutional portfolios, closed-end funds and other investments with long hold periods, emerging issues at the time of acquisition could become material concerns at disposition. Even those with shorter holds should consider climate impacts on systems with long lifespans, such as roofs or HVACs.

Occasionally, a climate risk assessment may identify factors significant enough to trigger a re-trade. One recent example of this occurred at a newly constructed resort in the Caribbean. The assessment identified windows that would not have tolerated the one-two punch of Hurricanes Irma and Maria, or the record-breaking winds of Hurricane Dorian. The buyer, citing business interruption/loss of revenue and market share as top concerns, demanded a $3 million price reduction.

Climate change data affects design decisions for new developments and for redevelopment projects. Advances in building materials and engineering can offer resiliency options that did not exist when a structure was originally built. Consider wildfires in the Western US. Just a few years ago, wildfire was a risk associated with remote or rural properties. Now, with California's widely recognized 'wildfire season,' concern for fire resiliency is prompting changes to building codes and research into fire-resistant building materials. A redevelopment project in a high fire risk location is likely to require 'building hardening' (using fire resistant materials) and incorporating 'defensible space' (a natural or landscaped area around a structure that is designed to reduce fire danger). It is worth noting that despite popular belief, most commercial properties on the West Coast are not high fire risk, so long as buildings are not surrounded by combustible material. However, even for buildings with low fire risk, air quality may be a concern if the asset is located in an area with frequent wildfires. Heat and smoke can affect the building envelope and create poor air quality for tenants.

Depending on risk tolerance and personal experience, property owners go to varying lengths to assess risk. Since Hurricane Katrina in 2005, many no longer find it adequate to assess flood risk by relying on FEMA maps. One institutional real estate management firm requires detailed studies of local levee and stormwater management systems, evaluating the projected impact of flooding not just at their sites but within the entire watershed area. Because standard modeling does not account for multiple days of rainfall, or how systems perform once they reach capacity, this firm requests advanced scenarios to understand worst-case loss liability and the impacts of the largest storm event to hit a specific area in the past.

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In evaluating mitigation strategies, property owners weigh cost, appearance and safety factors against the likelihood and potential impact of a climate event. For one hotelier in Miami, the value of beachfront property was worth the risk of sea-level rise and potential flooding, but not if mitigation strategies required compromising the ocean view. The solution: an underground wall that can be raised with the push of a button to block up to 30 inches of water. Another Florida hotel, facing the same risks, was designed to allow the ground floor to absorb flood water impact and break away while preserving the upper floors.

## Learning from the past, looking to the future

Both building science and climate change data have dramatically advanced over the last few decades. Research on climate change has exploded since 1990, when global organizations brought widespread attention to the issue. The establishment of the US Green Building Council (USGBC) in 1993 brought about the LEED program and sustainability initiatives in the building industry. Until these developments, the architecture/engineering community had relied on the same climate data for decades.

Now, any significant acquisition is scrutinized by consultants, subconsultants and analysts armed not only with updated climate data, but technology such as infrared scans, LiDAR, electrical load surveys and drone imagery — modern due diligence offers insights that were impossible even ten years ago. As investors leverage these changes to see beyond the current state of a real estate asset and anticipate its future, climate change/resiliency assessments will become more commonplace, possibly even standard PCA scope. Savvy investors will use forward-looking data and technology to understand their exposure to climate change risk and position their properties for maximum resiliency. ◆

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