Morgan Stanley

Weathering the Storm:

Integrating Climate Resilience Into Real Assets Investing

Introduction

As climate change impacts intensify around the world, so too do the economic impacts. Corporations, communities and investors worldwide face both acute risks from single severe weather events such as droughts, floods or hurricanes, and chronic risks from long-term changes in natural cycles and weather patterns.[1] Sectors built on physical assets, including real estate and infrastructure, are on the frontline of these climate impacts, posing challenges for real assets investors.

A New Operating Reality

Amid rising average global temperatures, severe weather events have become increasingly frequent and destructive. For many places, long-term climate impacts like sea level rise are combining with changing land use patterns, such as urbanization, to exacerbate risks to the built environment.

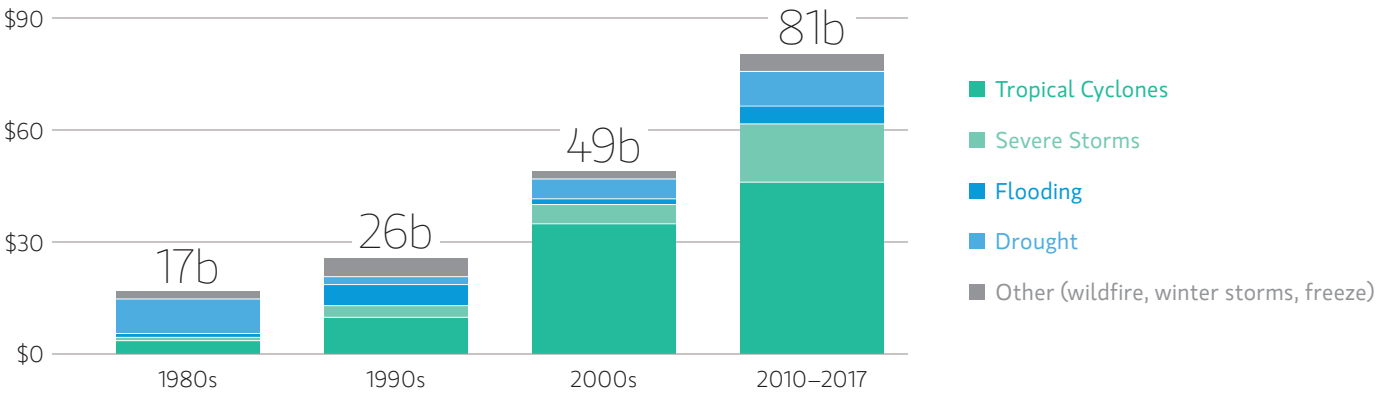
The results can be costly. According to the National Oceanic and Atmospheric Administration, since the 1980s, the number of inflation-adjusted billion-dollar weather and climate disaster events in the U.S. per decade grew from 28 during the 1980s to 91 from 2010 to 2017. Meanwhile, the average annual costs rose from $16.7 billion in the 1980s to $80.5 billion from 2010 to 2017. In 2017 alone, the United States experienced 16 weather and climate disasters with losses greater than $1 billion, costing the economy a record $309 billion.[2]

While not every event can be directly linked to climate change, its impact is increasingly clear. For example, researchers found that climate change likely increased Hurricane Harvey's record rainfall intensity by at least 20 percent.[3] The impact on the Houston area's housing and infrastructure was profound, with nearly 800,000 people in need of assistance in the weeks and months that followed.[4]

Facing such risks, cities and states globally have begun to adopt policies, programs and investments to mitigate and adapt to climate change, including by making infrastructure and buildings more resilient. Companies have been following suit, seeing the benefits to be gained from anticipating, responding to and recovering from climate risks and impacts. Investors in real assets are also compelled to act on the risk and opportunities afforded by adapting to a climate-changed world.

Average Annual Cost of Natural Disasters

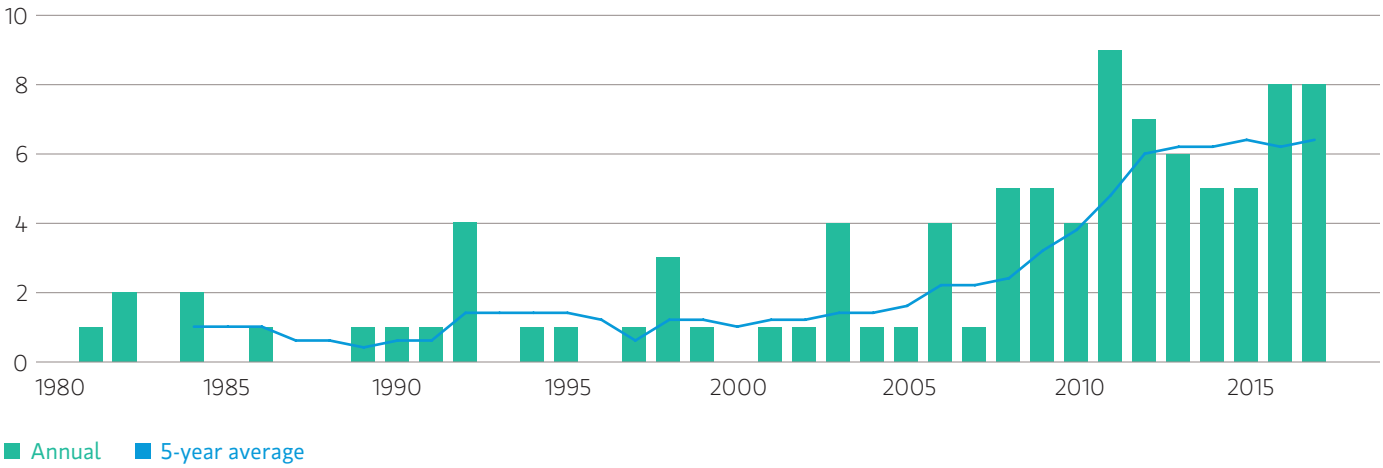
FIGURE 1
Inflation-Adjusted Cost, Disasters Exceeding $1 Bn in Impact
USD Bn, by Decade



Source: NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2018).
https://www.ncdc.noaa.gov/billions/

Annual Severe Storm Events, 1980–2017

FIGURE 2
Severe Storms Exceeding $1 Bn in Impact, Inflation-Adjusted
Annual and 5-Year Average



Source: NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2018).
https://www.ncdc.noaa.gov/billions/

Resilience and Real Assets

Climate resilience is fast becoming an investment imperative in real assets, where investments are often held for 10 years or more. In 2017, property and infrastructure damage from natural disasters accounted for an estimated $220 billion,[5] or two-thirds, of $330 billion in global economic losses.[6] Recognizing the need for investment in infrastructure globally, the UN Sustainable Development Goals have defined resilient infrastructure as a global imperative (Goal 9).

Beyond purchasing insurance, however, not all investors with significant real-asset portfolio exposure are managing the long-term risks associated with these investments.[8] In failing to understand this exposure, they not only ignore growing risk, but also miss out on the potential high returns of resilience efforts. These can include cost reductions (lower operating costs and averted damage), revenue growth (enhanced reputation, increased occupancy rates) and higher asset value.[9]

Faced with the prospect of more frequent billion-dollar weather events, how should real assets investors protect their investments with respect to climate resilience?

In this paper, Morgan Stanley Real Assets proposes a dual approach: first, assessing risk, and second, optimizing assets for climate resilience. Achieving these goals will require scrutinizing assets' exposure and vulnerability to climate impacts as well as employing multiple defenses to minimize disruption to buildings and infrastructure. The next two sections provide a roadmap for maximizing resilience through a combination of due diligence, forward-looking design, proactive disruption management and thoughtful divesting of certain assets.

Investing in climate-resilient portfolios will require trade-offs and judgment calls. For example, coastal locations that make highly attractive real estate investments are also very vulnerable to climate impacts related to rising sea levels. A World Bank/OECD study of the coastal cities most at risk from flooding is a case in point, including such major markets as Miami, New York, Boston, Osaka, Guangzhou and Mumbai.[10]

Similarly, a planned new building in a location such as a flood plain that is insurable today may not be insurable two decades down the road, leaving investors at risk of substantial future diminution in value. Depending on the asset, in some cases, the return will be worth the risk and investors can pursue ways to fortify it. In others, divestment from certain markets or of specific assets may ultimately be the soundest option.

Investors in infrastructure assets will face similar choices in the years ahead, since airports, cell towers and oil and gas pipelines are often located in areas at increasing risks from flooding, severe storms and extreme heat. For example, the European Commission's Joint Research Center predicts that damage costs from natural disasters to critical infrastructure including transport systems, energy generation plants and water supply networks could triple to €9.3 billion per year across the EU by the 2020s.[11]

At the same time, investments in resilient real estate and infrastructure may offer prospects for improved financial returns. A comprehensive evaluation of climate risk can help real assets investors accurately weigh risks and returns. Balancing resilience concerns and market attractiveness will be an important focus for investors and fund managers as they increasingly apply a climate lens to their investments. Many of the most core real estate markets in the United States and globally are in coastal areas subject to sea level rise, hurricanes and storm surges. But an investor that only considers climate risk may miss valuable market opportunities. A careful analysis of risk and returns is central to climate-resilient investing.

Defining Resilience

Resilience is an organization's ability to prepare, plan for, respond to and recover from adverse natural or human-caused events. Stresses can arise at the national, regional, city, submarket, asset, business or investment level, and can encompass multiple types of threat.

Resilient organizations enhance their adaptive capacity by making changes in processes, practices or structures to moderate or offset potential damages, or to take advantage of opportunities associated with changes in climate.[7]

In this paper, resilience refers solely to climate and other environmental-related risks.

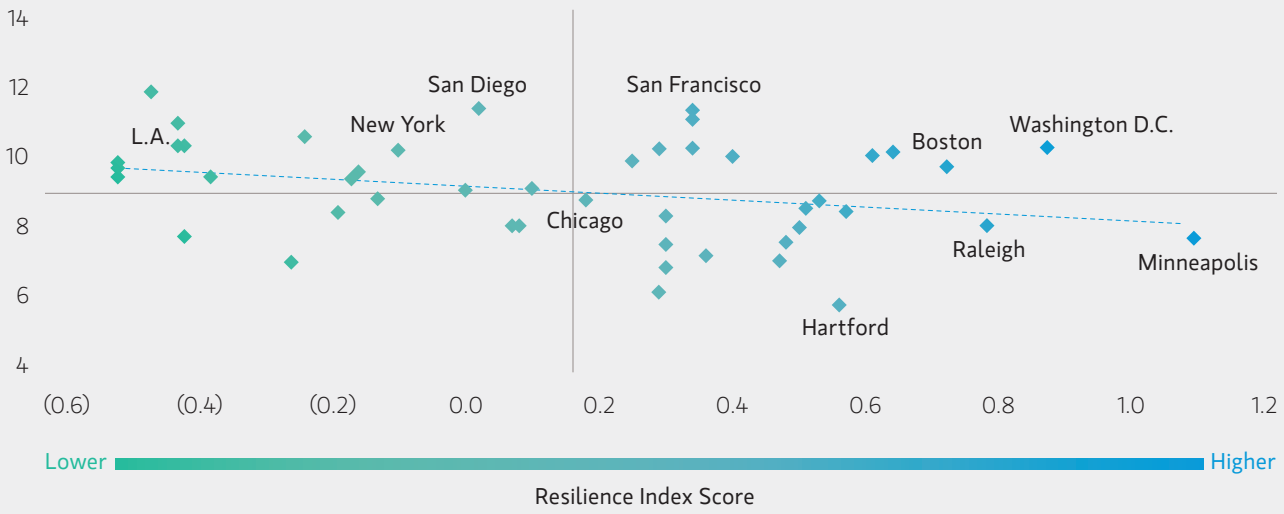
A Balancing Act

Carefully weighing risk, resilience and potential returns in tandem allows investors to identify attractive, climate resilient real estate markets in a more comprehensive way than considering metrics in isolation. For example, the University of California Berkeley's Resilience Capacity Index, a 12-metric average that quantifies the resilience capacity of 361 U.S. metropolitan statistical areas, includes preferences for higher homeownership rates, overall housing affordability and the share of the metro population in place for at least a year. Although these metrics help to prioritize stability, they may not correlate as well with income growth and total returns.

When these resilience scores are plotted against trailing 20-year real estate returns for 46 U.S. markets (measured by the NCREIF Property Index), we see the correlation is (0.23).[12] The most resilient cities do not always offer the highest returns to real estate investors. A narrow view of only resilience OR returns could guide investors to different real estate markets, while an analysis of both can highlight cities that are attractive on both dimensions.

Resiliency Capacity Index Negatively Correlated With Property Returns

FIGURE 3
Trailing 20 Years
% Total Return p.a., Unlevered



Source: NCREIF, University of California Berkeley, University at Buffalo Regional Institute, MSREI Strategy calculations, as of April 2018.

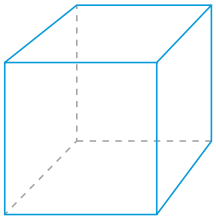
Assessing Climate Risk for Real Assets: A Three-Dimensional Approach

Against this backdrop, how can investors begin to evaluate real assets for climate risks and potential opportunities? A systematic approach, aimed at mitigating potential risks while maximizing opportunity, requires paying close attention to investment opportunities in a three-dimensional way.

A Three-Dimensional Approach to Assessing Climate Risk

FIGURE 4

1 **HAZARD:** the possible future occurrence of natural or human-induced physical effects that may trigger adverse impacts.



2 **EXPOSURE:** the inventory of elements in an area prone to hazard events.

3 **VULNERABILITY:** the likelihood of adverse effects on people, ecosystems, biodiversity, economic sectors or assets exposed to climate-related physical hazards.

Hazard

When looking at any given market from a climate impact perspective, investors should first ascertain the likely hazards the area faces. What types of extreme events can occur? What is the likelihood, given climate models, of a hazard occurring, and over what time horizon?

Climate-related hazards can take many forms and be deeply interrelated. As the climate changes in new and unpredictable ways, certain changes may set off feedback loops. Warming temperatures accelerate sea level rise both through glacial melting and thermal expansion. Droughts can exacerbate wildfires, which in turn can contribute to the frequency and severity of landslides. Current insurance models account for historical patterns, but those models may not apply in a changing climate. Investors should consider how those hazards will change over time as well as how they are related.

Exposure

After establishing potential hazards, investors should evaluate the exposure to expected climate impacts faced by their investments. Does a market or asset lie directly in the path of one or more potential hazards? To what extent are buildings and infrastructure situated in areas exposed to acute climate-related events or slow-build impacts?

For example, more than 60 percent of the world's population lives in Asia, and more than half of Asians live near the coast, making their property and infrastructure directly exposed to sea-level rise.[13] In the United States, Hurricane Sandy offers a prime example of the kind of acute damage to which rising sea levels can contribute, when peak storm surges caused more than $70 billion worth of damage in New York and New Jersey.[14] Due to sea level rise, storm surges are an estimated eight inches higher than in 1900.[15] According to Lloyd's of London, the 20cm rise in sea level at the tip of Manhattan since the 1950s has increased insured losses in New York by 30 percent.[16] Given the longevity of many real assets, taking long-term climate modeling into account is critical to sound risk assessment. For such information, investors can turn to publicly available data sources such as the U.S. Climate Resilience Toolkit. Maintained by U.S. government agencies, the portal provides current conditions, short-term forecasts and longer-term projections for 2035 and 2060, under varying climatological models. The maps in Figure 5 show the potential increase in intensity across U.S. markets of one-in-100 year storms in 2035 and 2060.

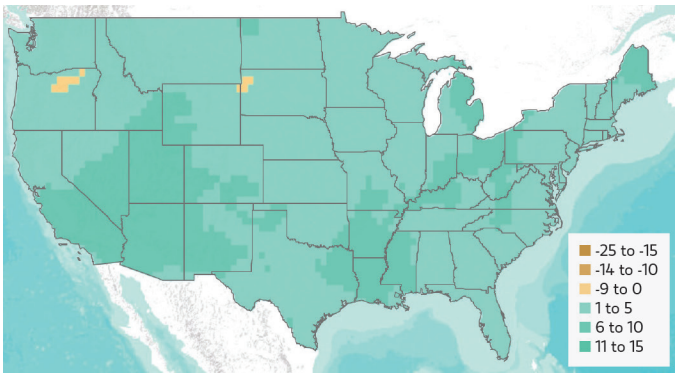
Such predictions, and their implications for real assets, are also complicated by the extent to which the international community reduces greenhouse gas emissions in the coming decades. By 2070, $35 trillion in real estate assets will be at risk if the world does not change its current carbon emissions trajectory, according to the UN Framework Convention on Climate Change (UNFCCC).[18]

At the asset level, investors should consider the relative exposure of a specific asset given local conditions. For example, in a market at high risk of flooding from sea level rise, is a specific property coastal or inland? Does it sit above sea level or below? Investors have traditionally relied on insurance to reduce exposure to risks, and will continue to do so as the climate changes. With the insurance industry facing increasingly unsustainable climate-related losses, however, the old models will no longer suffice. Insurance models will need to assess risk in a changing climate, and investors can work with insurers to find the way forward (see the Role of Insurance).

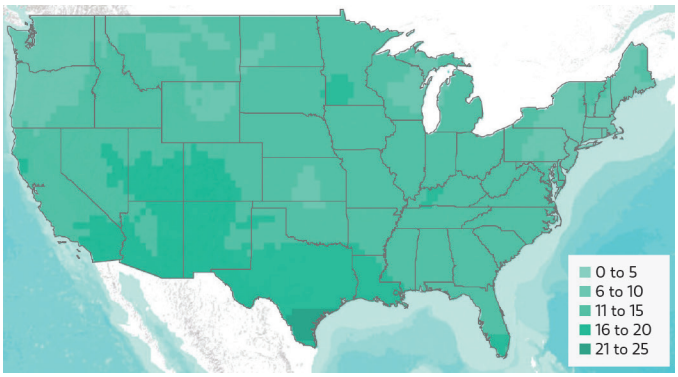
Projected Change in 100-Year Storm Intensity (%)

FIGURE 5

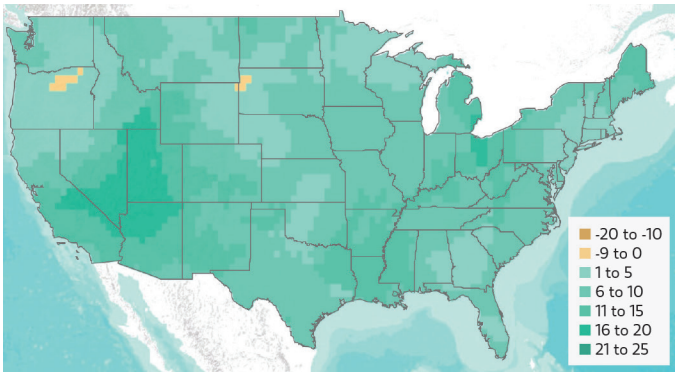
2035 (Less Stormy Scenario)



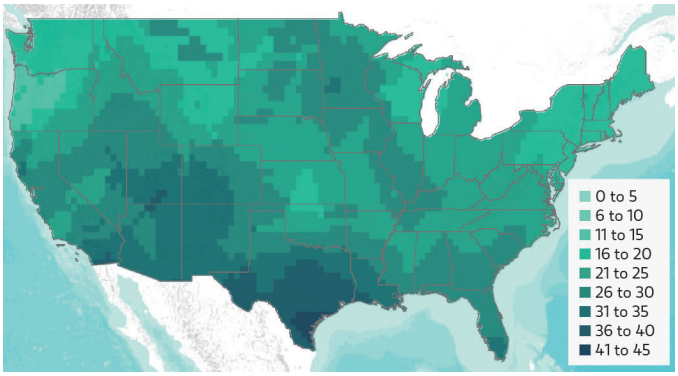
2035 (Stormy Scenario)



2060 (Less Stormy Scenario)



2060 (Stormy Scenario)



Source: U.S. EPA, CREAT Climate Scenarios Projection Map, as of March 2018.[17]

Vulnerability

Once hazard and exposure — today and in the future — are established, the final element of climate risk assessment is to ascertain vulnerability. How prepared are the local community, infrastructure and government to respond to disasters? What is the likelihood of people, ecosystems, economic sectors, supply chains or local businesses to suffer adverse effects from climate-related physical hazards, and how might these affect real assets investments? At a national level, macroeconomic capacity can make investments in real assets less risky. For example, countries with "a higher literacy rate, better institutions, higher per capita income, higher degree of openness to trade, and higher levels of government spending" are better able to withstand and recover from natural disasters.[19] Similarly, abundance of financial capital, in the form of deeper domestic credit markets and foreign exchange resources, can speed recovery.

At the city level, investors can look to collaborations and analyses of resilience for guidance. For example, the Rockefeller Foundation's 100 Resilient Cities program acts as a clearinghouse for best practices in urban resilience, working with mayor's offices of 100 cities worldwide. Participating cities commit to addressing a range of social and environmental challenges; those committing to address climate change reflect

The Role of Insurance in Managing Climate Risk

Real assets investors rely on insurance to help mitigate climate-related risk. Paying insurance premiums to enable rebuilding after extreme weather events, for example, enables investors to support otherwise attractive property markets in regions with high climate risk exposure.

However, today's insurance models are becoming outdated and unsustainable as climate risks intensify and the cost of losses grows. The $330 billion in global natural catastrophe insured and uninsured losses in 2017 was the second highest annual total to date (after $354 billion in 2011), while the total insured losses set a new record, at $135 billion.[22]

Given that historical data may not accurately benchmark future risk, pricing climate risk into property insurance premiums is difficult and poses a challenge to current insurance practices. The implications are twofold: climate risk today may be underpriced by insurance markets, and as models begin to price climate risk more accurately, premiums may rise and, in some cases, assets may become uninsurable.

The United Nations Environment Programme (UNEP) Finance Initiative established the Principles for Sustainable Insurance in 2012, to develop a common framework for the industry to address environmental, social and governance opportunities, including the risks of climate change. They guide insurers to embed environmental criteria into decision-making across business, including in risk management and underwriting processes, which, in time, will necessitate a more direct approach to pricing climate risk. More than 83 organizations have adopted the Principles, which represent more than 20 percent of global insurance premiums.[23]

Investors can play an active role in how all this unfolds by working with insurers to bolster the resilience of real estate and infrastructure, to prevent jumps in premiums and to preserve the long-term insurability of their most at-risk assets. Some insurers are now developing rating systems for real estate and infrastructure around asset exposure and vulnerability to severe weather events and other climate-related hazards.[24] By applying a ratings approach, insurers would foster best practices in terms of building design and preparedness by real asset owners, bringing benefits to investors and communities. Insurers could also offer the ability to insure a set of assets as a geographically diversified portfolio, rather than at the single asset level, enabling a more diversified approach to managing climate risk.

To help keep premiums down and incentivize climate resilience improvements, real assets investors can also press insurers for multi-year insurance contracts that reflect their commitments. The chief research officer of insurance brokerage, RMS, has signaled that insurers "would be prepared to invest in risk reduction if they knew someone guaranteed to stay insuring with them — as through some multi-year insurance contract."[25]

By partnering with the insurance industry as it evolves to more effectively price the risks of climate change to real assets, investors can help shape a more sustainable and resilient path forward.

a global network including London, Santiago and Los Angeles.[20] Resilience analyses, such as the Resilience Capacity Index (see A Balancing Act) consider the ways that socioeconomic and environmental factors come together to promote resilience.

As resilience relates to a specific asset, which characteristics make it vulnerable in an extreme event? To answer this question, investors evaluate every relevant aspect of their investment. When was the asset built and with what materials? What types of tenants and uses occupy the space? Does the property have storm windows and drains in place? If the location is flood-prone, is the electrical equipment in the basement, which would make it vulnerable to damage and longer disruption, or on the rooftop?

Such details can make a significant difference to damages and costs from a weather or climate event. For example, a mixed-use project in Boston that incorporated resilience features including elevated mechanical systems, seawalls and saltwater-tolerant landscaping found 2 to 18 percent higher rents and reduced its actuarial flood-loss expectancy by 90 percent.[21] By ascertaining the extent to which an asset is prepared for a changing climate, investors can make informed decisions on whether current or future investments are sound.

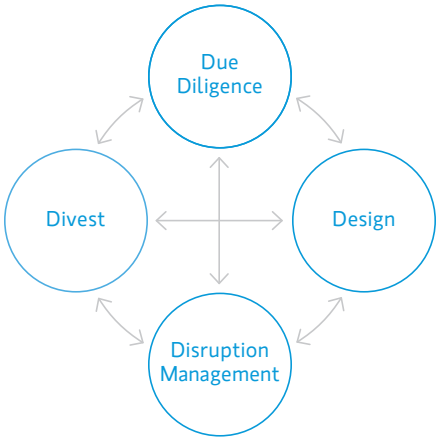
Building Climate Resilience Across a Real Asset's Lifecycle

Once investors understand the risks to current or potential real assets investments presented by climate hazards, exposure and vulnerability, how can they act on them?

Morgan Stanley Real Assets believes that considering resilience across an asset's lifecycle can help investors and asset managers make better decisions, minimize risk and capture the opportunities that climate-resilient buildings and infrastructure will increasingly offer.

A Lifecycle Approach to Managing Climate Risk

FIGURE 6



Assess market and asset climate risks during **due diligence**.

Incorporate resilient **design** elements during construction or retrofits to address vulnerabilities.

Be proactive about **disruption management** to prepare for and adapt to extreme events before they occur.

Consider partial or full **divestment** during ongoing asset management where investment risks outweigh opportunity.

Due Diligence

The first step is for property or infrastructure investors to apply due diligence criteria to climate hazards, exposure and vulnerability as they would with other risk factors such as financial, economic and political circumstances. Due diligence in a climate context involves a three-step process: identify risks, determine potential outcome severity and recommend actions to improve the property's resilience to the identified threats. This revolves around the concept that prior to investment, establishing a baseline set of resilience standards should be considered. In identifying risks, investors should first consider market-level conditions, including potential exposure to any and all severe weather events, other geological and climate change-related hazards and non-climate-related conditions that can exacerbate damage. As previously noted, historical baselines may not fully measure future conditions, so analysis should incorporate publicly available data sources such as the U.S. Climate Resilience Toolkit.

If investors green light an investment, they should gauge the building, pipeline or facility's ability to withstand the identified threats and recover operations after suffering damage, as well as its ability to withstand longer-term changes in climate systems. This view of resilience can be taken through the engineering lens of the "four Rs"—robustness, redundancy, resourcefulness and rapidity (the speed of response to disruptions).[26] Where investors find gaps or vulnerabilities in emergency and resilience management, they can take action to protect their assets.

Due diligence supports sound investing by determining the approximate costs associated with options to improve the asset's resilience to identified threats. These can be significant—for seismic property retrofits, for example, the city of Santa Monica, California, enacted programs with costs to building owners estimated at up to $50 to $100 per square foot for concrete and steel buildings, and $5,000 to $10,000 per unit for wood apartment buildings.[27] Careful consideration of the costs involved to enhance resilience is essential at all stages of the investment cycle, especially given the expectation that climate hazards and resulting impacts will intensify over time.

Design

Once an investment is made, investors can address asset-level vulnerabilities by implementing design improvements that enhance climate resilience by addressing robustness and redundancy. As the risks to real assets from extreme weather and ongoing climate change become clearer, resilient design is a focus area for the sector, with industry-wide best practices and standards being adopted and developed for both new construction and for retrofits.

For investors, using such standards and credentials can provide useful guidance in designing a new asset or retrofitting an existing one. Credentials can also offer positive brand opportunities and can bring benefits beyond those triggered if a climate event strikes and resilience measures are in place.

Design Credentials

There are a range of credentials programs investors can look to for guidance on environmental design and resilience. Some of the most widely recognized credentials include:

RELi: In November 2017, U.S. Green Building Council (USGBC) introduced a new resilient design rating system known as RELi, a tool for assessing building and community resilience to severe weather and climate events. RELi builds on LEED guidelines piloted in 2015, which included planning for climate change and emergencies, designating and designing for a building's top three hazards, and establishing design of "passive survivability"—a property's ability to tolerate long-term interruption of power, heating fuel or water.

PEER certification: USGBC also offers sustainability and resilience infrastructure credentials for power networks and microgrids through its PEER certification (Performance Excellence in Electricity Renewal).

Global Real Estate Sustainability Benchmark (GRESB): GRESB measures real estate and infrastructure companies' sustainability performance, including a new resilience module in 2018.

Envision: For infrastructure assets, the Institute for Sustainable Infrastructure offers the Envision credential which includes climate and risk as one of five sustainability categories.[29] Companies are rated on factors including resiliency criteria, creating a climate impact assessment and adaptation plan, and designing measures that safeguard against natural hazards, promote long-term resilience and adaptive capability, and avoid traps and vulnerabilities.

The Urban Land Institute's Ten Principles for Building Resilience offer best practices for incorporating resilience into real assets by taking a view of economic, environmental and social factors together.

Meanwhile the National Institute of Building Sciences has documented the costs and benefits of designing new buildings that are more robust to climate change. In a 2017 report, its researchers found that investing in hazard mitigation measures that exceed relevant requirements of the International Code Council's 2015 model building codes could save $4 for every $1 spent.[28]

Enhancing robustness and redundancy requires designing, building and renovating assets with specific hazards in mind. Climate change may increase the frequency and severity of extreme temperatures—both hot and cold. Buildings at risk of heatwave-triggered power outages can support redundancy by upgrading back-up generator capacity. Orienting and shading buildings to reduce heating and cooling needs, or installing glazed glass, operable windows or super-insulated building envelopes can enhance energy efficiency and make a building more robust to extreme temperatures. Moving power lines below ground and upgrading insulation can protect local electricity grids during heatwaves (as well as storms and earthquakes). Water system upgrades can help prevent against cooling water shortages for facilities such as power plants.

For assets vulnerable to impacts from droughts, buildings can install drought-tolerant landscaping and make use of rainwater/graywater collection and reuse systems. Natural landscaping and rooftop gardens can also help reduce cooling loads in regions where drought is exacerbated by heat waves.

To withstand flooding conditions from storm surges, heavy rain or rising sea levels, asset managers can raise mechanical equipment and backup generators above ground level to help minimize power interruptions. Backup power systems can also keep interiors air-conditioned, reducing the chance of mold or mildew developing during power interruption. Landscaping with native plants, bioswales and raised berms can help protect against storm surges and tides and absorb stormwater runoff.[30]

Storm surges and flooding are often accompanied by high-wind conditions during hurricanes or typhoons. Storm-rated wind-resistant windows prevent damage by withstanding the stress of high winds or impact from projectiles.

Designated refuge areas or interior rooms can protect building occupants by providing shelter during storms.

Infrastructure assets are designed with lifespans of several decades or more, and will accordingly need to adapt to long-term changes in climate systems and the frequency of extreme weather events over time. For example, airport runways, roads and rail transport in regions faced with intensifying heatwaves will likely need to be designed to tolerate greater heat. Bridges and oil and gas pipelines may need modifications to withstand more frequent flooding and support redundancy in the case of an event. Flood barriers are already in use to protect London and coastlines in the Netherlands, and are due to be implemented in Venice during 2018. In the coming decades, such defenses may also be needed in U.S. Eastern seaboard cities such as Boston and New York.

Communications infrastructure is of critical importance during and after an extreme weather event, yet these systems themselves are vulnerable to damage. Redundant systems can help ensure continuity and thereby enable other community response systems to mobilize quickly. For example, as wireless telecommunications networks can be vulnerable to damage from hurricanes, flooding and earthquakes, networks can build in redundant data centers and alternative fiber rings, which would allow continued operations even if the main systems are disrupted.

Investors who keep on top of design modifications and best practices for resilient infrastructure will not only protect against risk, but may see the value of their assets rise as demand grows for services such as continuously available electricity and air conditioning in a changing climate.

DESIGNING FOR THE FUTURE

Designing for resilience will also be an iterative process. As the scope and frequency of climate events change, design standards and best practices will evolve. In designing for today, best practice considers projections for mean sea level and the likelihood of 10-year, 50-year and 100-year storms in the future. These parameters, however, may evolve depending on how climate change impacts play out in the coming decades. This obviously affects new construction, requiring investors to consider leading edge design features and standards in order to safeguard assets against unknowable future threats.

Designing for future use also requires consideration of the ways that individuals and communities will use infrastructure, buildings and real assets in the future. In designing systems intended to last for 10, 20 or 50+ years, climate-aware investors should consider the ways that systems can and will change. Advances in fuel sources, communications networks and distribution systems have the potential to impact how today's infrastructure investments are used in the future. How and where those investments are made can impact the ability of a community to respond to climate events — both the ability to access critical resources and the speed of response.

Lincoln Road Retail, Miami: Resilience in Action

Every year, millions of tourists visit Miami, Florida, from all over the world, drawn to beautiful beaches, a booming nightlife and a rich cultural history. Business is thriving as well, with annual business establishment growth of 2 percent from 2010–2015, more than double the national average.[31] Amidst the glitz and glamour, it's easy to forget that Miami is one of the United States' most at-risk cities in the face of climate change. Miami's overall costs to coastal property from sea-level rise through 2100 are modeled at roughly $80 billion, the second highest in the United States after Tampa.[32]

At the heart of South Beach sits Lincoln Road, a popular shopping and tourism district. Across all phases of the investment lifecycle, it is important to consider climate risk and put systems in place to increase the property's resilience to climate change.

DUE DILIGENCE: Due diligence research and analysis identified sea level rise and hurricanes as potential threats to Lincoln Road, but also took into account the potential returns of owning and operating a retail property in one of the United States' most popular markets for dining and entertainment. In the end, investors might determine the benefits of investing in the property outweigh the risks and focus on designing and managing the building with resilience in mind.

DESIGN: The retail buildings at Lincoln Road include robust design features like impact windows and raised grading to withstand heavy winds and debris as well as flooding. Mechanical equipment is raised above ground level to prevent water damage. The city has existing plans to upgrade stormwater drains to mitigate flooding. During severe storms, flood panels can be used to help prevent damage to facilities and to tenants' merchandise.

DISRUPTION MANAGEMENT: Perhaps most important are the systems in place at Lincoln Road that ensure resourcefulness and rapidity in the event of an emergency. Emergency response plans are pre-established with clear lines of authority for decision-making and spending. Duplicate copies of emergency plans are stored offsite in the event that the facilities cannot be accessed or electronic systems are down.

On site, critical resources and supplies, including emergency contact lists, are stored in easily and safely accessible locations on upper floors, enabling personnel to carry out response plans uninterrupted. Shelter in place protocols are established as well, to ensure that anyone left on site can remain safe during a storm and after, in the event that roads or bridges are inaccessible.

The site manager has pre-established contracts in place with key suppliers to repair and replace buildings or equipment quickly and cost-effectively. Facilities staff help carry out emergency plans; they are hired on a contract basis so additional support can be brought in as needed.

In short, while Lincoln Road may be exposed and vulnerable to climate-related hazards such as hurricanes, careful planning across the investment lifecycle means assessing climate risks, establishing a resilience strategy and helping protect the site against physical and safety risks in the event of an emergency.

Additionally, both near- and long-term resilience measures for any real asset could be blunted if the local government's approach to managing climate risk is inadequate. This means that investors should be evaluating not only the design of their own assets, but also the potential need for upgrades to surrounding infrastructure, such as roads, water systems, sewers and electrical lines. Infrastructure systems are often interrelated, and the resilience of a single asset is dependent on the ability of the surrounding infrastructure to anticipate, withstand and respond to adverse events. For a real assets investor, the more effective and long-lasting that municipal resilience policies are, the better.

Disruption Management

The third phase in the roadmap for investors to build real assets resilience is proactive disruption management. This involves creating systems and processes that ensure resourcefulness and rapidity as part of business continuity planning.

While some disruption is inevitable during severe weather events, effective real asset management considers resilience before, during and after such disasters, which can make a big difference to the human and economic consequences.

Before an event is on the radar, pre-establishing contract terms and obligations with key suppliers will prove valuable in the aftermath of extreme weather events, since taking bids on repair or replacement after the storm drives up costs and exacerbates delays. Pre-positioning supplies and readying a detailed list of potential contacts are also important to have in place ahead of time. Because roads and bridges are at risk in extreme weather events, key personnel could have difficulty reaching the site. Advance planning is helpful to prepare for such a possibility, and provisions to shelter in place along with backup personnel and off-site duplicate, hard-copy records may be useful. By considering the ways that resources can be accessed and mobilized ahead of time, investors can thereby enhance the rapidity of a disaster response.

In immediate recovery from severe weather events, the focus should be on sustaining life and then restoring facility operations to full capacity. With these addressed, design and disruption management are iteratively connected. Some missed imperatives in minimizing disruption may be obvious, while others could be uncovered by thorough after-the-fact briefing. Additional resiliency measures can then be assessed and ideally put in place.

Divest

In balancing resilience concerns, market attractiveness and cost/benefit analysis, investors may conclude that a potential or current asset does not meet the necessary thresholds or criteria to justify an investment. Where returns no longer balance with risks, investors or fund managers may opt to divest. Such decisions may be made as a result of due diligence, or during ongoing assessment and review of a portfolio or an individual asset's performance.

Alternatively, investors may choose to set gating criteria for resilience measures for an asset, a market or both. Investors planning for climate resilience can take lessons from other types of natural phenomena, such as seismic activity. Where baseline criteria are not met, it is important to evaluate the costs of necessary upgrades, and if feasible, make the improvements. These standards help avoid investing in real estate with lateral load-resistance and other metrics below pre-agreed criteria to withstand earthquakes.

Given the long duration of real asset lifecycles and intensifying climate hazards, investors should thoughtfully consider climate risk at all stages of an investment, continually making decisions about design, disruption management and divestment that enable them to build and manage a resilient portfolio for the long term.

Conclusion

This brief highlights the necessity for real assets investors to evaluate and act on climate risk to safeguard their investments. It also showcases the financial and reputational opportunities that resilient property and infrastructure can offer.

As populations continue to urbanize, real asset value will become ever more concentrated in urban centers, which in turn will become the frontline for climate resilience and adaptation. By conducting due diligence, pursuing design that prepares for a climate-changed world, and working with insurers, municipal authorities and other stakeholders to promote resilience, investors can play an important role in this evolution. Below, we suggest actionable questions that can serve as a starting point for assessing and building climate resilience at each stage of a real asset's lifecycle.

Key Questions for Building Climate Resilience

DUE DILIGENCE

1. How will climate change and severe weather affect the asset?
2. How resilient is the surrounding community and/or infrastructure?

DESIGN

1. How will the design influence the resilience of the asset to acute and long-term risks?
2. How do resilience upgrades or credentials impact the cost of my insurance premiums or value of an asset?

DISRUPTION MANAGEMENT

1. In the event of an emergency, with what companies, government agencies and individuals does the property's management need to have established relationships/agreements?
2. Who has decision-making authority during an emergency situation? If that person is unavailable, what is the chain of command?

DIVEST

1. How often should investors reevaluate portfolios for climate risk?
2. At what point does an asset become uninsurable?

Notes

1 "Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures," Task Force on Climate-related Financial Disclosures, June 2017 (https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Report-062817.pdf).

2 "Assessing the U.S. Climate in 2017," National Centers for Environmental Information, National Oceanic and Atmospheric Administration, January 5, 2018 (https://www.ncei.noaa.gov/news/national-climate-201712).

3 "Attributable Human-Induced Changes in the Likelihood and Magnitude of the Observed Extreme Precipitation During Hurricane Harvey," Geophysical Research Letters, Mark Risser and Michael Wehner, December 12, 2017 (https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017GL075888).

4 "Historic Disaster Response to Hurricane Harvey in Texas," Federal Emergency Management Association, September 22, 2017 (https://www.fema.gov/news-release/2017/09/22/historic-disaster-response-hurricane-harvey-texas).

5 Analysis by Morgan Stanley Investment Management, as of April 2018.

6 "Natural Catastrophe Review: Series of Hurricanes Makes 2017 Year of Highest Insured Losses Ever," Munich RE, January 4, 2018 (https://www.munichre.com/en/media-relations/publications/press-releases/2018/2018-01-04-press-release/index.html).

7 Business in a Climate-Constrained World," BSR, April 2014 (https://www.bsr.org/reports/BSR_Business_in_a_Climate_Constrained_World_Report.pdf).

8 "Investing in a Time of Climate Change," Mercer, September 16, 2017 (https://www.mercer.com/our-thinking/wealth/investing-in-a-time-of-climate-change.html).

9 "Returns on Resilience: The Business Case," Urban Land Institute, 2015, (http://uli.org/wp-content/uploads/ULI-Documents/Returns-on-Resilience-The-Business-Case.pdf).

10 "Which Coastal Cities Are at Highest Risk of Damaging Floods? New Study Crunches the Numbers," World Bank, August 19, 2013 (http://www.worldbank.org/en/news/feature/2013/08/19/coastal-cities-at-highest-risk-floods).

11 "Critical Infrastructure to be Hard Hit By Climate Hazards," EU Science Hub, European Commission, November 28, 2017 (https://ec.europa.eu/jrc/en/news/critical-infrastructure-be-hard-hit-climate-hazards).

12 NCREIF, University at Buffalo Regional Institute, Analysis by Morgan Stanley Real Estate Investing, as of April 2018.

13 "Up in Smoke? Asia and the Pacific: the Threat From Climate Change to Human Development and the Environment," Working Group on Climate Change and Development, New Economics Foundation, November 2007 (https://www.oxfam.org.nz/sites/default/files/reports/Up_in_Smoke_ASIA_EMBARGO%2019%2011%2007.pdf).

14 Business in a Climate-Constrained World," BSR, April 2014 (https://www.bsr.org/reports/BSR_Business_in_a_Climate_Constrained_World_Report.pdf).

15 "Storm Surge," U.S. Climate Resilience Toolkit, October 6, 2017 (https://toolkit.climate.gov/topics/coastal/storm-surge).

16 "Catastrophe Modelling and Climate Change," Lloyd's, 2014 (available at https://www.lloyds.com/news-and-risk-insight/risk-reports/library/natural-environment/catastrophe-modelling-and-climate-change).

17 "CREAT Climate Scenarios Projection Map," U.S. Environmental Protection Agency (https://epa.maps.arcgis.com/apps/MapSeries/index.html?appid=3805293158d54846a29f750d63c6890e; accessed March 2018).

18 "Biennial Assessment and Overview of Climate Finance Flows," United Nations Climate Change, 2016 (https://unfccc.int/topics/climate-finance/resources/biennial-assessment-of-climate-finance). Cited in "Real Estate Investors Finally Consider Climate Risks," Joyce Coffee, Triple Pundit, January 24, 2018 (https://www.triplepundit.com/2018/01/know-enough-act-real-estate-investors-finally-consider-climate-risks/).

19 "The Macroeconomic Consequences of Disasters," Ilan Noy, Journal of Development Economics, 2009 (https://ideas.repec.org/a/eee/deveco/v88y2009i2p221-231.html).

20 "About Us," Rockefeller Foundation, 100 Resilient Cities, 2018 (https://www.100resilientcities.org/about-us/; accessed May 3, 2018).

21 "Returns on Resilience: The Business Case," Urban Land Institute, 2015, (http://uli.org/wp-content/uploads/ULI-Documents/Returns-on-Resilience-The-Business-Case.pdf)

22 "Natural Catastrophe Review: Series of Hurricanes Makes 2017 Year of Highest Insured Losses Ever," Munich RE, January 4, 2018 (https://www.munichre.com/en/media-relations/publications/press-releases/2018/2018-01-04-press-release/index.html).

23 "The PSI Initiative," PSI Principles for Sustainable Insurance, UNEP Finance Initiative (http://www.unepfi.org/psi/vision-purpose/; accessed May 3, 2018).

24 "Climate Risk Disclosure Survey," National Association of Insurance Commisioners, 2016 (accessible at http://www.naic.org/cipr_topics/topic_climate_risk_disclosure.htm); and "Insurer Climate Risk Disclosure Survey Report & Scorecard: 2016 Findings & Recommendations," Max Messervy, Ceres, October 2016 (https://www.ceres.org/sites/default/files/reports/2017-03/Ceres%20Insurer%20Climate%20Risk%20Disclosure%20Survey.pdf).

25 "Insurance as Contributors to Problem Solving and Impact Reduction," The Geneva Association, June 14, 2015 (https://www.genevaassociation.org/research-topics/extreme-events-and-climate-risk/insurance-contributors-problem-solving-and-impact).

26 Cimarello, G (2010), cited in "Operationalizing Resilience Against Natural Disaster Risk: Opportunities, Barriers, and a Way Forward," Zurich Flood Resilience Alliance, Adriana Keating, et al., 2014 (http://opim.wharton.upenn.edu/risk/library/zurichfloodresiliencealliance_ResilienceWhitePaper_2014.pdf).

27 "Operationalizing Resilience Against Natural Disaster Risk: Opportunities, Barriers and a Way Forward," Zurich Flood Resilience Alliance, Adriana Keating et al., 2014 (http://opim.wharton.upenn.edu/risk/library/zurichfloodresiliencealliance_ResilienceWhitePaper_2014.pdf). "Santa Monica Adopts Nation's Most Extensive Earthquake Retrofit Plan," Rong-Gong Lin II, Los Angeles Times, March 29, 2017 (http://www.latimes.com/local/lanow/la-me-ln-santa-monica-earthquake-retrofit-20170328-story.html).

28 "Natural Hazard Mitigation Saves: 2017 Interim Report," National Institute of Building Sciences, 2017 (https://www.nibs.org/page/mitigationsaves).

29 "Envision," Institute for Sustainable Infrastructure (http://sustainableinfrastructure.org/envision/; accessed April 30 2018).

30 "Returns on Resilience: The Business Case," Urban Land Institute, 2015, (http://uli.org/wp-content/uploads/ULI-Documents/Returns-on-Resilience-The-Business-Case.pdf).

31 "Miami Ranks Near the Top for Business Growth, Study Says," Keith Larsen, South Florida Business Journal, February 23, 2018 (https://www.bizjournals.com/southflorida/news/2018/02/23/miami-ranks-near-the-top-for-business-growth-study.html).

32 "Climate Change in the United States: Benefits of Global Action," United States Environmental Protection Agency, 2015 (https://www.epa.gov/sites/production/files/2015-06/documents/cirareport.pdf).

Acknowledgements

Morgan Stanley would like to thank BSR, Edward Cameron, Emilie Prattico and David Korngold for their contributions to this work. For further reading, please see:

Cameron, E.; Harris, S.; Prattico, E. 2018. "Resilient Business, Resilient World: A Research Framework for Private-Sector Leadership on Climate Adaptation." Report. BSR, San Francisco, CA.

Risk Considerations

There is no assurance that a portfolio will achieve its investment objective. Portfolios are subject to market risk, which is the possibility that the **market value** of securities owned by the portfolio will decline. Accordingly, you can lose money investing in these portfolios. Please be aware that these portfolios may be subject to certain additional risks. Changes in the worldwide economy, consumer spending, competition, demographics and consumer preferences, government regulation and economic conditions may adversely affect **global franchise companies** and may negatively impact these portfolios to a greater extent than if these portfolios' assets were invested in a wider variety of companies. In general, equity securities' values also fluctuate in response to activities specific to a company. **Exchange traded funds (ETFs)** shares have many of the same risks as direct investments in common stocks or bonds and their market value will fluctuate as the value of the underlying index does. By investing in exchange traded funds (ETFs), the portfolio absorbs both its own expenses and those of the ETFs it invests in. Supply and demand for ETFs may not be correlated to that of the underlying securities. Investments in **foreign markets** entail special risks such as currency, political, economic, and market risks. The risks of investing in **emerging market countries** are greater than risks associated with investments in foreign developed markets. **Asia market** entails liquidity risk due to the small markets and low trading volume in many countries. In addition, companies in the region tend to be volatile and there is a significant possibility of loss. Furthermore, because the strategy concentrates in a single region of the world, performance may be more volatile than a global strategy.

Privately placed and restricted securities may be subject to resale restrictions as well as a lack of publicly available information, which will increase their illiquidity and could adversely affect the ability to value and sell them (liquidity risk). **Derivative instruments** may disproportionately increase losses and have a significant impact on performance. They also may be subject to counterparty, liquidity, valuation, correlation and market risks. Stocks of **small-capitalization companies** carry special risks, such as limited product lines, markets and financial resources, and greater market volatility than securities of larger, more established companies. **Non-diversified portfolios** often invest in a more limited number of issuers. As such, changes in the financial condition or market value of a single issuer may cause greater volatility. **Option writing strategy**. Writing call options involves the risk that the Portfolio may be required to sell the underlying security or instrument (or settle in cash an amount of equal value) at a disadvantageous price or below the market price of such underlying security or instrument, at the time the option is exercised. As the writer of a call option, the Portfolio forgoes, during the option's life, the opportunity to profit from increases in the market value of the underlying security or instrument covering the option above the sum of the premium and the exercise price, but retains the risk of loss should the price of the underlying security or instrument decline. Additionally, the Portfolio's call option writing strategy may not fully protect it against declines in the value of the market. There are special risks associated with uncovered option writing which expose the Portfolio to potentially significant loss.

Important Disclosures

General. The information contained herein refers to research, but does not constitute an equity research report and is not from Morgan Stanley Equity Research. Unless otherwise indicated, the views expressed are those of the research and strategy team of Morgan Stanley Real Assets and may differ from those of Morgan Stanley Equity Research and other Morgan Stanley affiliates (including others within Morgan Stanley Real Assets). These views may also differ from investment strategies implemented by Morgan Stanley Real Assets now or in the future. The information (including facts, opinions, estimates or projections) contained herein is based on financial, economic, market and other conditions prevailing as of the date hereof. As such, it remains subject to change at any time. By providing such information, Morgan Stanley Real Assets or the Morgan Stanley Institute for Sustainable Investing assumes no obligation to provide any update or supplement to such information following the date hereof. Although reasonable care has been taken to ensure that the information (including facts, opinions, estimates or projections) contained herein is accurate, complete and fair, no warranty, express or implied, is made as to the accuracy, completeness or fairness of such information. Certain economic and market information contained herein may have been obtained from third- parties sources. While Morgan Stanley Real Assets or the Morgan Stanley Institute for Sustainable Investing believes that such sources are reliable, neither Morgan Stanley Real Assets nor any other Morgan Stanley affiliate has independently verified such information or assumes any responsibility or liability for the accuracy, completeness or fairness of such information or any omission of information.

Confidentiality. The information contained herein is highly confidential. By accepting these materials, you agree that such materials (including any data, analysis, conclusions or other information contained herein and all oral information, if any, provided by Morgan Stanley Real Assets or the Morgan Stanley Institute for Sustainable Investing in connection herewith) may not be photocopied, reproduced or otherwise shared or distributed to any other persons, in whole or in part, without the prior consent of Morgan Stanley Real Assets. Notwithstanding the foregoing, such materials and information may be provided to (a) your legal, tax, financial and other advisors who agree to maintain these materials in confidence and (b) a government official to the extent necessary to comply with a judicial or governmental order.

Past Performance. Past performance is not indicative of future results. Any projected or target returns contained herein are being provided for informational purposes only. Investments in real estate may result in the loss of principal. There can be no assurance that any projected or target returns, or any returns at all, will be achieved.

Forward-Looking Statements. These materials contain projections and other forward-looking statements. Any statements that are not historical facts are forward-looking statements that involve risks and are inherently uncertain. Sentences or phrases that use such words as "believe," "anticipate," "plan," "may," "hope," "can," "will," "expect," "should," "goal," "objective," "projected" and similar expressions also identify forward-looking statements, but their absence does not mean that a statement is not forward-looking. Portfolio "profiles" by property type, location, investment structure, leverage or return for blind pool or partially blind pool products should be treated as projections. Projections and other forward-looking statements, including statements regarding Morgan Stanley Real Assets' or the Morgan Stanley Institute for Sustainable Investing's assessment of the market, are by their nature uncertain insofar as actual realized returns or other projected results can change quickly based on, among other things, unexpected market movements, changes in interest rates, legislative or regulatory developments, errors in strategy execution, acts of God and other asset-level developments. There can be no assurance that projections and other forward-looking information will not change based on subsequent developments and without further notice, and no assurance can be given as to outcome. You should not place undue reliance on forward-looking statements, including forecasts and projections, and statements regarding the assessment of the market, which speak only as of the date referenced herein.

The views and opinions are those of the authors as of May 2018, and are subject to change at any time due to market or economic conditions and may not necessarily come to pass. The views expressed do not reflect the opinions of all portfolio managers at Morgan Stanley Investment Management or the Morgan Stanley Institute for Sustainable Investing or the views of the Firm as a whole, and may not be reflected in all the strategies and products that the Firm offers.

There is no guarantee that any investment strategy will work under all market conditions, and each investor should evaluate their ability to invest for the long-term, especially during periods of downturn in the market. There are important differences in how the strategy is carried out in each of the investment vehicles. Your financial professional will be happy to discuss with you the vehicle most appropriate for you given your investment objectives, risk tolerance and investment time horizon.

The document has been prepared solely for information purposes and does not constitute an offer or a recommendation to buy or sell any particular security, or to adopt any specific investment strategy. The material contained herein has not been based on a consideration of any individual client circumstances and is not investment advice, nor should it be construed in any way as tax, accounting, legal or regulatory advice. To that end, investors should seek independent legal and financial advice, including advice as to tax consequences, before making any investment decision.

Except as otherwise indicated herein, the views and opinions expressed herein are those of Morgan Stanley Investment Management or the Morgan Stanley Institute for Sustainable Investing, and are based on matters as they exist as of the date of preparation and not as of any future date, and will not be updated or otherwise revised to reflect information that subsequently becomes available or circumstances existing, or changes occurring, after the date hereof.

Any index referred to herein is the intellectual property (including registered trademarks) of the applicable licensor. Any product based on an index is in no way sponsored, endorsed, sold or promoted by the applicable licensor and it shall not have any liability with respect thereto.

In addition, real estate investments are subject to a variety of risks, including those related to, among other things, the economic climate, both nationally and locally, the financial condition of tenants and environmental regulations.

EMEA: This communication was issued and approved in the United Kingdom by Morgan Stanley Investment Management Limited, 25 Cabot Square, Canary Wharf, London E14 4QA, authorized and regulated by the Financial Conduct Authority, for distribution to Professional Clients only and must not be relied upon or acted upon by Retail Clients (each as defined in the UK Financial Conduct Authority's rules).

Financial intermediaries are required to satisfy themselves that the information in this document is suitable for any person to whom they provide this document in view of that person's circumstances and purpose. Morgan Stanley Investment Management or the Morgan Stanley Institute for Sustainable Investing shall not be liable for, and accepts no liability for, the use or misuse of this document by any such financial intermediary. If such a person considers an investment she/he should always ensure that she/he has satisfied herself/himself that she/he has been properly advised by that financial intermediary about the suitability of an investment.

This communication is only intended for and will only be distributed to persons resident in jurisdictions where such distribution or availability would not be contrary to local laws or regulations.

United Kingdom: Morgan Stanley Investment Management Limited is authorised and regulated by the Financial Conduct Authority. Registered in England. Registered No. 1981121. Registered Office: 25 Cabot Square, Canary Wharf, London E14 4QA, authorised and regulated by the Financial Conduct Authority. **Dubai:** Morgan Stanley Investment Management Limited (Representative Office, Unit Precinct 3-7th Floor-Unit 701 and 702, Level 7, Gate Precinct Building 3, Dubai International Financial Centre, Dubai, 506501, United Arab Emirates. Telephone: +97 (0)14 709 7158). **Germany:** Morgan Stanley Investment Management Limited Niederlassung Deutschland Junghofstrasse 13-15 60311 Frankfurt Deutschland (Gattung: Zweigniederlassung (FDI) gem. § 53b KWG). **Italy:** Morgan Stanley Investment Management Limited, Milan Branch (Sede Secondaria di Milano) is a branch of Morgan Stanley Investment Management Limited, a company registered in the UK, authorised and regulated by the Financial Conduct Authority (FCA), and whose registered office is at 25 Cabot Square, Canary Wharf, London, E14 4QA. Morgan Stanley Investment Management Limited Milan Branch (Sede Secondaria di Milano) with seat in Palazzo Serbelloni Corso Venezia, 16 20121 Milano, Italy, is registered in Italy with company number and VAT number 08829360968. **The Netherlands:** Morgan Stanley Investment Management, Rembrandt Tower, 11th Floor Amstelplein 1 1096HA, Netherlands. Telephone: 31 2-0462-1300. Morgan Stanley Investment Management is a branch office of Morgan Stanley Investment Management Limited. Morgan Stanley Investment Management Limited is authorised and regulated by the Financial Conduct Authority in the United Kingdom. **Switzerland:** Morgan Stanley & Co. International plc, London, Zurich Branch Authorised and regulated by the Eidgenössische Finanzmarktaufsicht ("FINMA"). Registered with the Register of Commerce Zurich CHE-115.415.770. Registered Office: Beethovenstrasse 33, 8002 Zurich, Switzerland, Telephone +41 (0) 44 588 1000. Facsimile Fax: +41(0) 44 588 1074.

Hong Kong: This document has been issued by Morgan Stanley Asia Limited for use in Hong Kong and shall only be made available to "professional investors" as defined under the Securities and Futures Ordinance of Hong Kong (Cap 571). The contents of this document have not been reviewed nor approved by any regulatory authority including the Securities and Futures Commission in Hong Kong. Accordingly, save where an exemption is available under the relevant law, this document shall not be issued, circulated, distributed, directed at, or made available to, the public in Hong Kong. **Singapore:** This document should not be considered to be the subject of an invitation for subscription or purchase, whether directly or indirectly, to the public or any member of the public in Singapore other than (i) to an institutional investor under section 304 of the Securities and Futures Act, Chapter 289 of Singapore ("SFA"),

(ii) to a "relevant person" (which includes an accredited investor) pursuant to section 305 of the SFA, and such distribution is in accordance with the conditions specified in section 305 of the SFA; or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA. In particular, for investment funds that are not authorized or recognized by the MAS, units in such funds are not allowed to be offered to the retail public; any written material issued to persons as aforementioned in connection with an offer is not a prospectus as defined in the SFA and, accordingly, statutory liability under the SFA in relation to the content of prospectuses does not apply, and investors should consider carefully whether the investment is suitable for them. **Australia:** This publication is disseminated in Australia by Morgan Stanley Investment Management (Australia) Pty Limited ACN: 122040037, AFSL No. 314182, which accept responsibility for its contents. This publication, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act. **Japan:** For professional investors, this document is circulated or distributed for informational purposes only. For those who are not professional investors, this document is provided in relation to Morgan Stanley Investment Management (Japan) Co., Ltd. ("MSIMJ")'s business with respect to discretionary investment management agreements ("IMA") and investment advisory agreements ("IAA"). This is not for the purpose of a recommendation or solicitation of transactions or offers any particular financial instruments. Under an IMA, with respect to management of assets of a client, the client prescribes basic management policies in advance and commissions MSIMJ to make all investment decisions based on an analysis of the value, etc. of the securities, and MSIMJ accepts such commission. The client shall delegate to MSIMJ the authorities necessary for making investment. MSIMJ exercises the delegated authorities based on investment decisions of MSIMJ, and the client shall not make individual instructions.

All investment profits and losses belong to the clients; principal is not guaranteed. Please consider the investment objectives and nature of risks before investing. As an investment advisory fee for an IAA or an IMA, the amount of assets subject to the contract multiplied by a certain rate (the upper limit is 2.16% per annum (including tax)) shall be incurred in proportion to the contract period. For some strategies, a contingency fee may be incurred in addition to the fee mentioned above. Indirect charges also may be incurred, such as brokerage commissions for incorporated securities. Since these charges and expenses are different depending on a contract and other factors, MSIMJ cannot present the rates, upper limits, etc. in advance. All clients should read the Documents Provided Prior to the Conclusion of a Contract carefully before executing an agreement. This document is disseminated in Japan by MSIMJ, Registered No. 410 (Director of Kanto Local Finance Bureau (Financial Instruments Firms)), Membership: The Investment Trusts Association, Japan, the Japan Investment Advisers Association and the Type II Financial Instruments Firms Association.

Morgan Stanley is a full-service securities firm engaged in a wide range of financial services including, for example, securities trading and brokerage activities, investment banking, research and analysis, financing and financial advisory services.

Diversification does not guarantee a profit or protect against loss in a declining financial market.

A portfolio concentrated in a single market sector may present more risk than a portfolio broadly diversified over several market sectors.

Real Assets may include precious metals, commodities, oil and gas interests and timber interests. The prices of real assets tend to fluctuate widely and in an unpredictable manner. Real assets may be affected by several factors, including global supply and demand, investors' expectations with respect to the rate of inflation, currency exchange rates, interest rates, investment and trading activities of hedge funds and commodity funds, and global or regional political, economic or financial events and situations.

Real estate investments are subject to special risks, including interest rate and property value fluctuations, as well as risks related to general and economic conditions.

Morgan Stanley, its affiliates and Morgan Stanley Financial Advisors do not provide tax, accounting or legal advice. Individuals should consult their tax advisor for matters involving taxation and tax planning and their attorney for matters involving legal matters.

Morgan Stanley is not responsible for the information contained on any third party website or your use or inability to use such site, nor do we guarantee its accuracy or completeness. The terms, conditions, and privacy policy on any third party website may be different from those applicable to your use of any Morgan Stanley website. The opinions expressed by the author of an article written by a third party are solely his/her own and do not necessarily reflect those of Morgan Stanley. The information and data provided by any third party website of publication is as of the date of the material when it was written and is subject to change without notice.

For more information on Morgan Stanley Investment Management, visit **www.morganstanley.com/im**

For more information on Morgan Stanley Institute for Sustainable Investing, visit **www.morganstanley.com/sustainableinvesting**

CRC 2168753 Exp. 07/03/2019