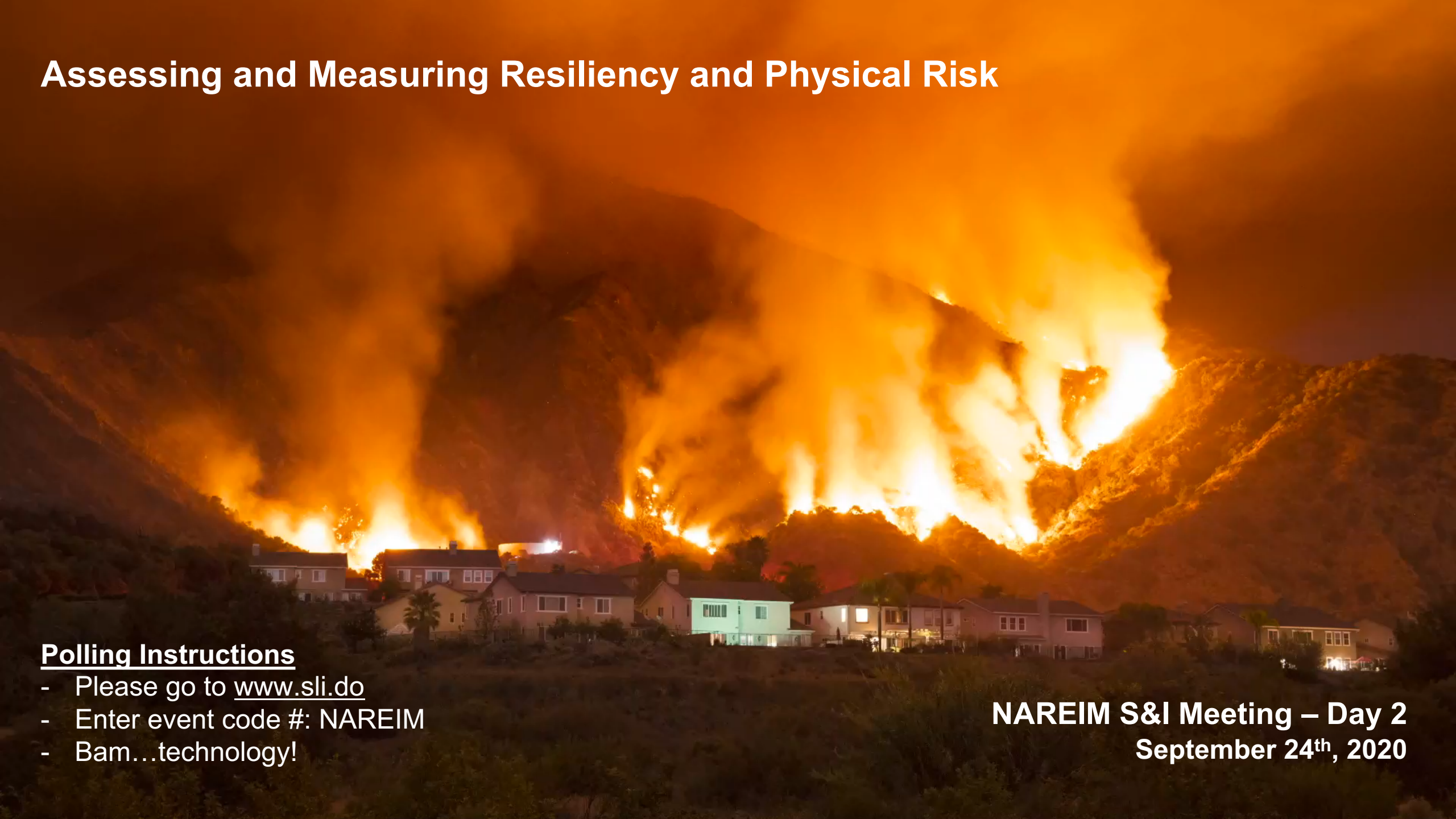
Assessing and Measuring Resiliency and Physical Risk



Polling Instructions

- Please go to www.sli.do
- Enter event code #: NAREIM
- Bam…technology!

NAREIM S&I Meeting – Day 2

September 24th, 2020

2019 Aon Annual Report: Weather, Climate & Catastrophe Insight

Global Insured Losses

Exhibit 8: Top 10 Global Insured Loss Events

Date(s)	Event	Location	Deaths	Economic Loss (USD billions)	Insured Loss (USD billions)
October 6-12	Typhoon Hagibis	Japan	99	15.0	9.0
September 7-9	Typhoon Faxai	Japan	3	10.0	6.0
May – July	Mississippi Basin Floods	United States	0	10.0	4.0
May 27-30	Severe Weather	United States	0	4.5	3.6
Aug 25 – Sep 7	Hurricane Dorian	Bahamas, Caribbean, US, Canada	83	10.0	3.5
March 12-31	Missouri Basin Floods	United States	10	10.0	2.5
October 20-21	Dallas Tornadoes	United States	4	2.8	2.2
March 23-25	Severe Weather	United States	0	1.8	1.4
March 10-11	Windstorm Eberhard	Western & Central Europe	2	1.6	1.2
September 17-22	Tropical Storm Imelda	United States	5	5.0	1.2
			All Other Events	161 billion	36 billion
			Totals	**232 billion[1]**	**71 billion[1,2]**

2019 Aon Annual Report: Weather, Climate & Catastrophe Insight

Global Insured Losses

Exhibit 8: Top 10 Global Insured Loss Events

Date(s)	Event	Location	Deaths	Economic Loss (USD billions)	Insured Loss (USD billions)
October 6-12	Typhoon Hagibis	Japan	99	15.0	9.0
September 7-9	Typhoon Faxai	Japan	3	10.0	6.0
May – July	Mississippi Basin Floods	United States	0	10.0	4.0
May 27-30	Severe Weather	United States	0	4.5	3.6
Aug 25 – Sep 7	Hurricane Dorian	Bahamas, Caribbean, US, Canada	83	10.0	3.5
March 12-31	Missouri Basin Floods	United States	10	10.0	2.5
October 20-21	Dallas Tornadoes	United States	4	2.8	2.2
March 23-25	Severe Weather	United States	0	1.8	1.4
March 10-11	Windstorm Eberhard	Western & Central Europe	2	1.6	1.2
September 17-22	Tropical Storm Imelda	United States	5	5.0	1.2
			All Other Events	161 billion	36 billion
			Totals	**232 billion[1]**	**71 billion[1,2]**

TCFD | TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

TRANSITION RISKS		PHYSICAL RISKS
Policy and legal	**Markets**	**Acute**
• Increased pricing of GHG emissions • Enhanced emissions-reporting obligations • Mandates on and regulation of existing products and services • Exposure to litigation	• Changing customer behavior • Uncertainty in market signals • Increased cost of raw materials	• Increase severity of extreme weather events such as cyclones and floods *(causing damages on facilities, reduction or disruption in production capacity…)*
Technology	**Reputation**	**Chronic**
• Substitution of existing products and services with lower emissions options • Unsuccessful investment in new technologies • Upfront costs to transition to lower emissions technology	• Shift in consumer preferences • Stigmatization of sector • Increased stakeholder concern or negative stakeholder feedback	• Changes in precipitation patterns and extreme variability in weather patterns • Rising mean temperatures • Rising sea levels *(causing damages on facilities, increased operating costs, impacts to workforce management and planning…)*

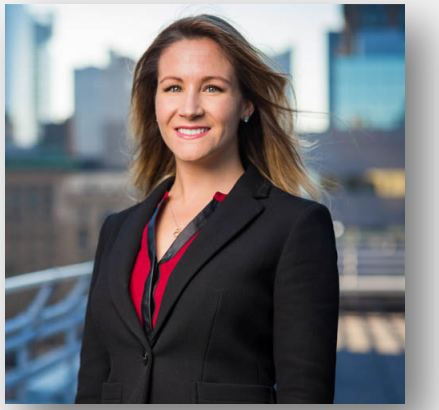
Source: I4CE, adapted from TCFD. (2016). Recommendations of the Task Force on Climate-related Financial Disclosure.

Today's Panels

Your Esteemed Presenters…if I do say so myself!

Moderator

Eric Duchon
Global Head of Sustainability
LaSalle Investment Management



Meghan Johnson
Senior Analyst
The Climate Service

Jessica Long
Head of Sustainability, Americas
Nuveen

Kevin Scroggin
Director of Risk Management
LaSalle Investment Management

Polling Instructions

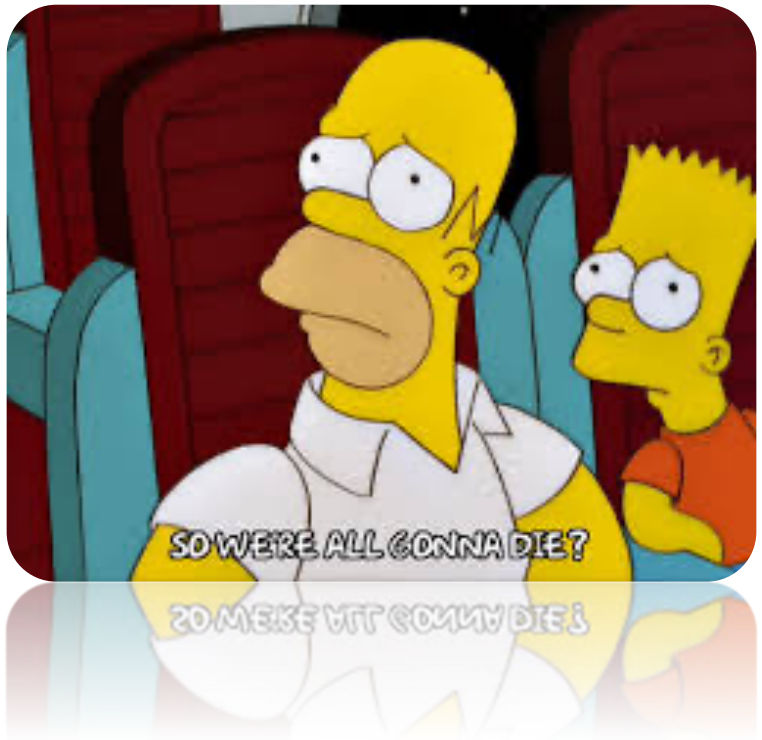
- Please go to www.sli.do
- Enter event code #: NAREIM
- Bam…technology!

Polling Question #1

Has your company begun to assess Physical Risk?

If so, how?

- Yes, using climate risk data analytics
- Yes, an internal process
- Yes, interfacing with insurance providers
- Yes, but I don't know how
- No, we're all going to die so what's the point?



Polling Instructions

- Please go to www.sli.do
- Enter event code #: NAREIM
- Bam…technology!

TheClimateService

Meghan Johnson, Associate Senior Analyst

mjohnson@theclimateservice.com | theclimateservice.com

Expertise in climate, tech and financial risk

James McMahon
CEO

James McMahon founded The Climate Service with the vision that every economic decision on Earth should incorporate climate change

Harvard University

MIT

Coca Cola

NOAA

Dr. Terence Thompson
CTO

Dr. Terence Thompson has led advanced climate analysis in industry for over 20 years and ran an AI Lab climate analytics group

LMI Consulting

Airbus

NASA

FAA

Joseph Lake
COO

Joseph Lake has spent 15 years measuring and managing risk (climate, sovereign, credit, currency, macro risk) for financial institutions

MD, Climate Risk, The Economist

The Economist Intelligence Unit

Ministry of Finance, Tanzania

Tory Grieves
VP of Analytics

Tory Grieves previously structured green infrastructure credit markets with NatureVest, the investment arm of The Nature Conservancy

Dolma Impact Fund

Biohabitats

Yale University

Dr. Therese Feng
VP of Research

Dr. Therese Feng brings 20 years of experience in finance, including stress-testing and risk architecting, & environmental economics research

Jefferies

Morgan Stanley

Fitch Ratings

Harvard Kennedy School

Yale University

World-class Advisory Board

IPCC Nobel Prize Recipients

Dr. Tom Karl
NOAA, White House

Dr. Don Wuebbles
Nat'l Climate Assmt.

Dr. Dave Easterling
NOAA

Dr. Russ Vose
NOAA

Chris Mailander
CEO, Tech Executive

Joyce Coffee
CEO, Climate Resilience

Dr. Steve Wilson
ProAdapt
Ph.D. Economist

Susan Hassol
Director, Climate Comm.

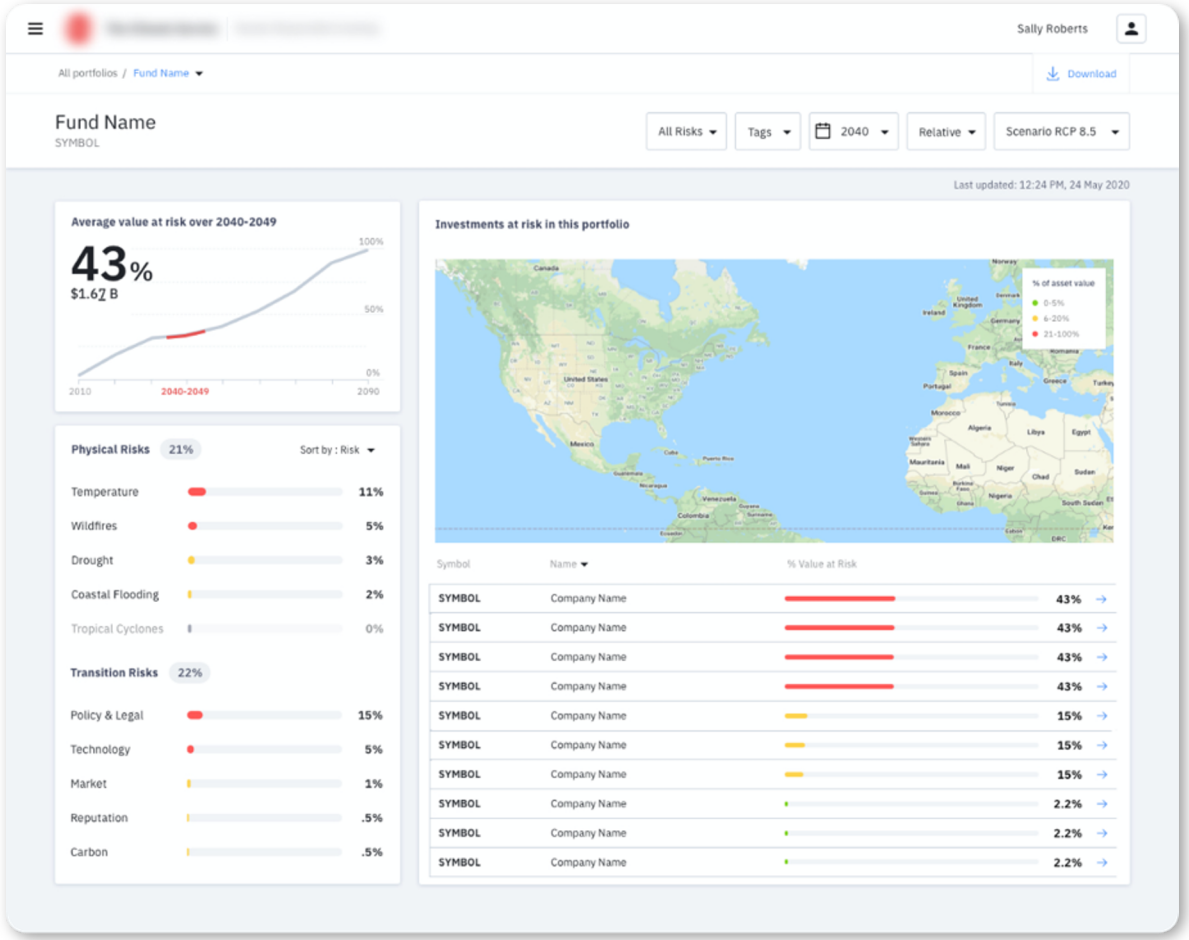
Stacy Swann
CEO, Climate Finance

TheClimateService

Climanomics® Risk Analytics Platform

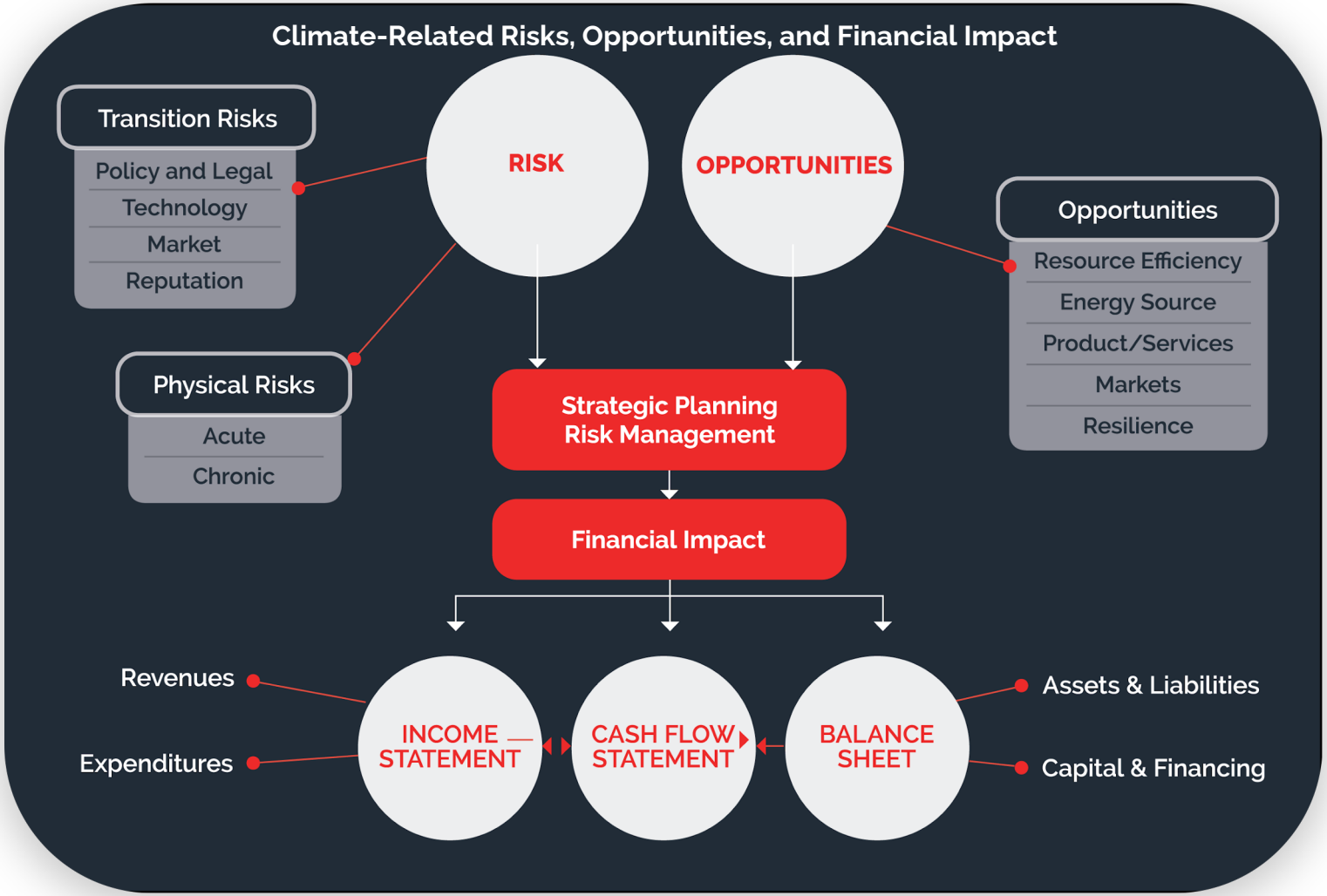
Software as a Service (SaaS) platform

- Asset, Company, and Portfolio-Level Insights
- One-click Climate Scenario Analysis
- Time Horizon of 2020 – 2100
- Financial Impact
- Physical and Transition Risk



TheClimateService

The Climanomics® platform is aligned with the TCFD



“Leader” in Climate Risk Analytics

“Leads the pack with **robust data** and analytics capabilities.”

“Is the best fit for companies that need a **complete platform** for climate risk.”

FORRESTER®
NEW WAVE LEADER 2020
Climate Risk Analytics

Robust and refined modeling framework

HAZARD

Physical

Coastal flooding

Hurricane/storms

Drought

Wildfires

Extreme temperatures

Tropical cyclones

Water stress

River flooding

Transition

Carbon pricing

Litigation

Reputation

Technology

VULNERABILITY

Operations

Property damage/repair

Energy & water costs

Employee productivity

Owner-Investor, Owner-Occupier, or Tenant.

Supply Chain

Interruption

Costs

Indirect impacts

Rental market growth

Municipal level adaptation

Insurability

FINANCIAL RISK

Balance sheet

Stranded or impaired assets

Income Statement

Loss of revenue

Operating costs

Labor costs

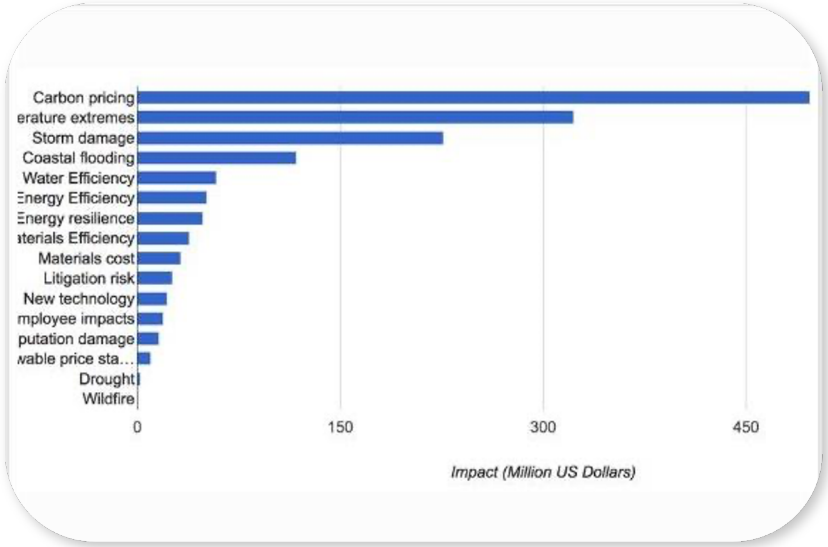
Legal costs

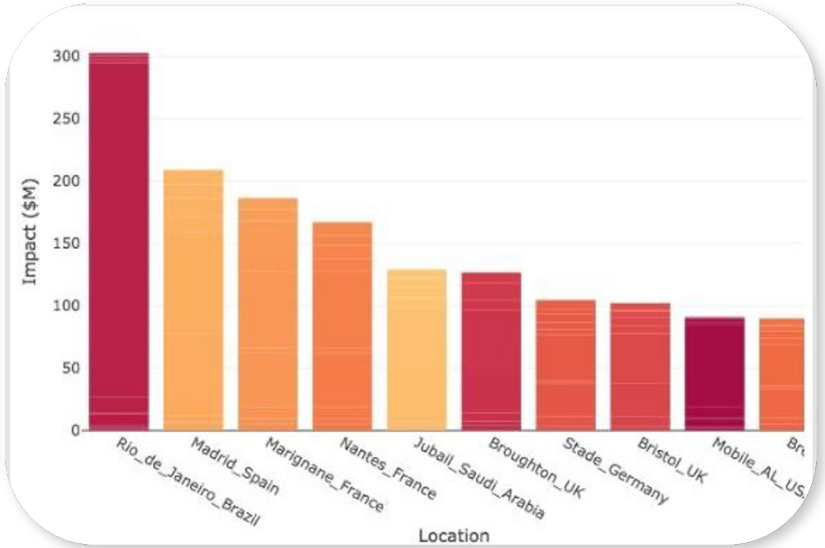
Insurance costs

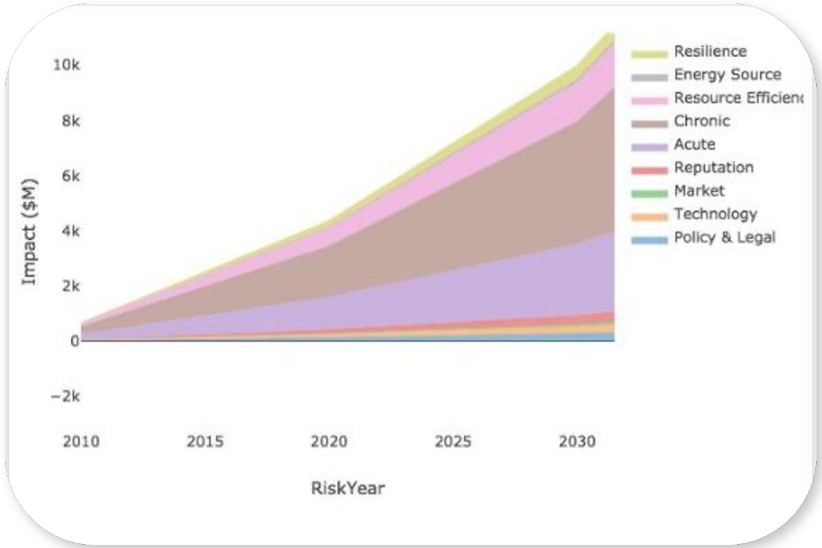
Cost of capital

Credit/bond risk

What, where and when of climate risk, in $







What: Top Risk Factors

1. Carbon pricing
2. Temperature extremes
3. Storms & coastal flooding

Where: Top Properties

1. Rio de Janeiro, Brazil
2. Madrid, Spain
3. Marignane, France

When: Risk Timing

1. Risk grown by 6.5x in past decade
2. Projected to double in next decade
3. Financial risk growing at 13% per year

TheClimateService

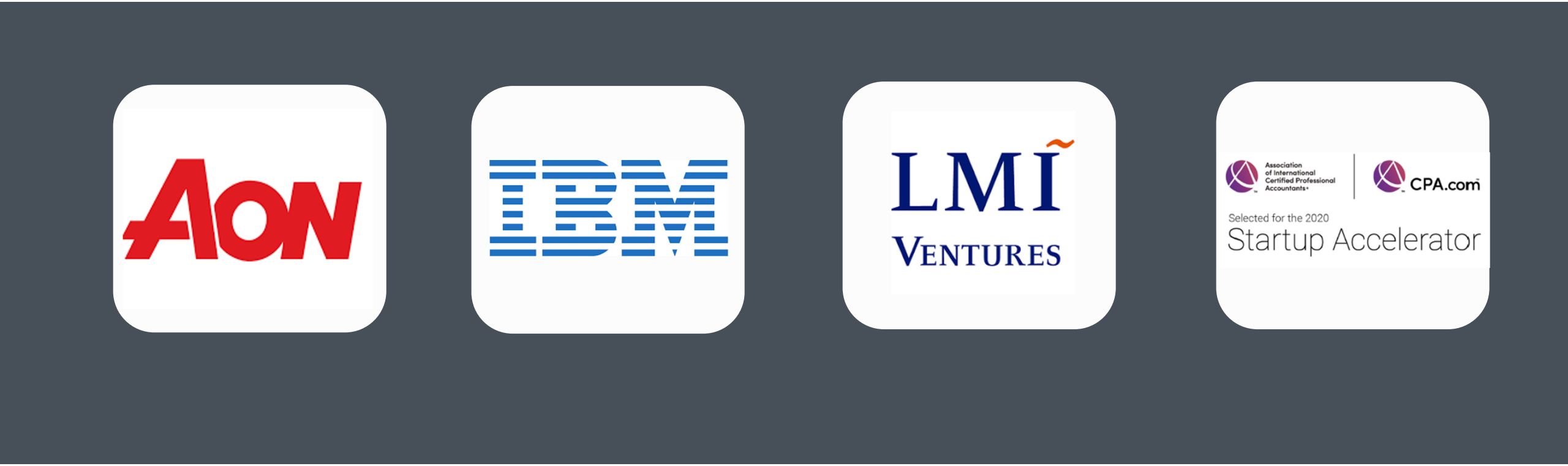
Case Studies

	1	2	3
Company	**Real estate investor in Asia**	**Asset manager with >$500B in AUM**	**Top-5 global food & beverage company**

Services provided	• Climate risk screening (across full range of hazards, time periods, and climate scenarios) of real estate assets.
	• Analysis of climate risk by portfolio and fund, including the absolute and relative financial impact of each climate hazard.
	• Briefings to facilitate incorporation into investment decisions, portfolio and fund management, and sustainability reporting.
		• Real Estate
		  • Asset level analysis
		  • Regional analysis (US State-level)
		• Agricultural assets
		• Other Investments
		  • Listed Equities
		  • Corporate, sovereign, muni bonds
		  • CMBS
			• Climate risk screening of owned and leased assets:
			  • Offices
			  • Manufacturing Facilities
			  • Warehouses
			• Climate risk screening of suppliers:
			  • Direct suppliers (farms)
			  • Indirect suppliers (crop-region level analysis of frequent sourcing areas)

Benefits delivered	• The first quantified understanding of client's climate risk at various levels (individual asset, fund, and portfolio). • Client then expanded climate risk analytics into investment decisions across the firm.	• Quantified and assessed climate risk at level of asset and investment/business at scale • Analysis outputs configured to type of security and specific entity/use of funds	• Quantified climate risk insights parsed by business unit, region, asset ownership • Analysis outputs used for internal briefings and as the foundation for risk mitigation strategies.

Strategic Partnerships



Real Estate modeling approach

Vulnerability functions capture impacts to relevant metrics, such as Net Operating Income and Capital Expenditures. For each hazard, outputs can be viewed as individual expenses by damage pathway or as net average annual losses, expressed as a percentage of Asset Value.

Damage functions modeled specifically by property type (Office, Retail, Industrial, Multifamily, etc.) to account for differences in how each asset responds to each hazard.

Designed for portfolio risk assessments and analyzing potential acquisitions.

Accounts for direct building-level financial impacts, as well as indirect market impacts that affect demand. Vulnerability functions for Owner-Investor, Owner-Occupier, or Tenant.

Ability to "toggle" damages on/off to capture insurance and expenses that may be passed through to tenants via Common Area Maintenance (CAM).

ASSET LEVEL

Physical
Repairs, maintenance, clean-up

Insurance Cost
Deductible, Premiums, Premium surcharges as appropriate

Building-Level Adaptation
Measures & Costs

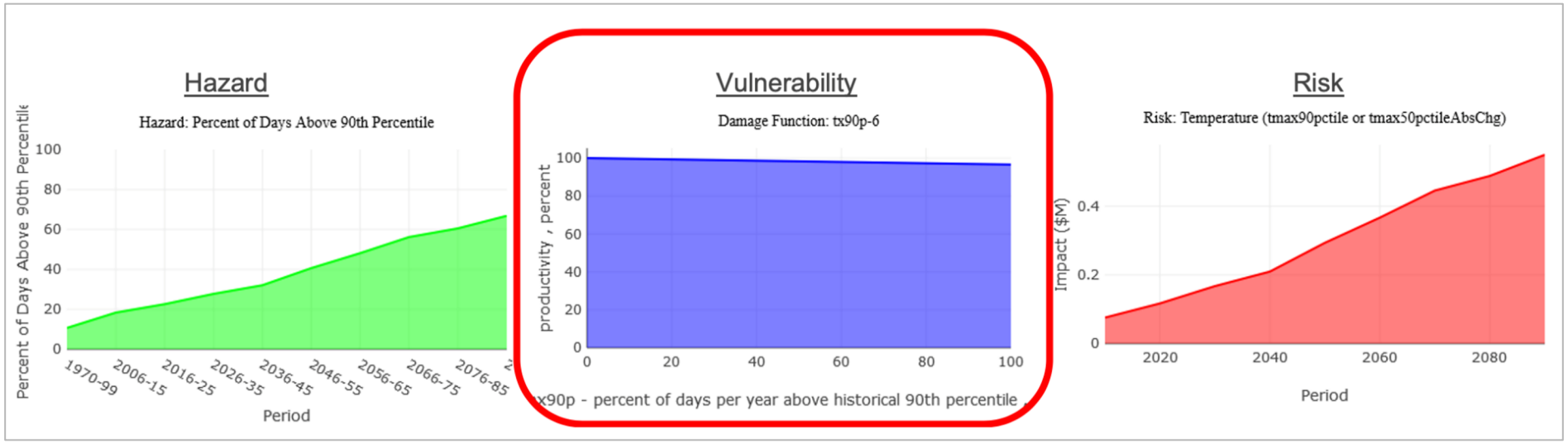
Other changes in expenses
Utility costs

MARKET LEVEL

Effects on tenants, residents and infrastructure

- Power outages
- Transport disruptions
- Productivity diminishment
- Health impacts
- Nuisance flooding and evacuations
- Increased pass-through costs to tenants for repairs, insurance, utilities, etc.

Real Estate modeling approach



By Property Type

1. Office
2. Retail
3. Multifamily, low-rise
4. Etc.

By Ownership Status

1. Investor-Owner
2. Owner-Occupier
3. Tenant

TheClimateService

Real Estate modeling approach

TCS is currently developing a framework on how to consider adaptation measures and indirect market impacts on real estate investments, building upon the current Climanomics® outputs that focus more on the direct damages at the property level.

Building-Level Adaptation – How protected is this property based on 'innate' qualities (i.e. year of construction) and adaptation investments that have or can be made?

Municipal Adaptation – How protected is the property based on investments the city has or is likely to make in the future? How confident should I be that the city will take action?

Insurability – How confident should I be that I will be able to purchase insurance coverage at reasonable cost for certain perils in this market going forward?

Rental Market Growth – How likely is it that tenants and residents will continue to view this market as desirable?

Liquidity – How will direct and indirect risks impact demand for real estate in this area in the future? How might this impact the potential buyer pool, the time it takes to sell, and the selling price upon exit?

TheClimateService

Meghan Johnson, Associate Senior Analyst

mjohnson@theclimateservice.com | theclimateservice.com

Joseph Lake, COO

(212) 519-7596 | jlake@theclimateservice.com | theclimateservice.com

Polling Question #2

Recognizing that some of these factors interact with each other, which of these potential financial impacts of climate risks causes you the greatest concern? (pick top 3)

- Reduced rental demand from tenants and residents
- Diminishing pool of willing buyers at exit
- Increasing costs of insurance or potential loss of insurability
- Increasing expenses other than insurance (i.e., repair & maintenance, cooling costs, etc.)
- Uncertainty around future cap rates
- Market prices impacted by some other means

Polling Instructions

- Please go to www.sli.do
- Enter event code #: NAREIM
- Bam…technology!

nuveen
A TIAA Company

Tomorrow's World

Assessing and measuring resiliency and physical risk

September 24, 2020

NAREIM S&I Meeting

Jessica L. Long

Our sustainability objectives across our portfolio

> Investing in tomorrow's world, for the enduring benefit of our clients and society.

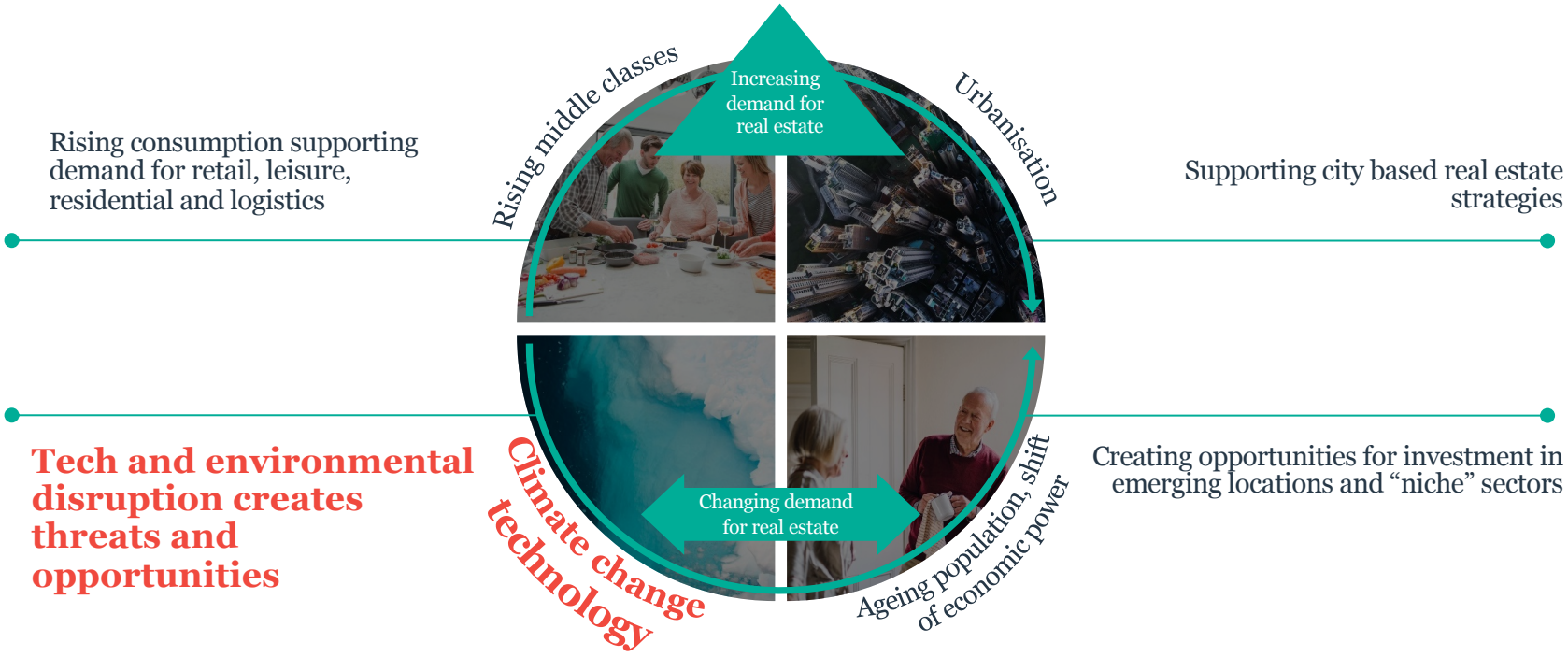
2030: 30% reduction
in portfolio-wide energy intensity from a 2015 baseline

Net zero carbon
with development of portfolio-wide pathway by 2020

2020: 100% climate risk integration
Using climate science and scenario planning to evaluate the financial impacts of climate change for new investments and existing portfolio exposure.

Source: Nuveen Real Estate, 2020.

Impacts to the long term structural demand for real estate



Deploying capital in sustainable cities

A global framework for constructing a sustainable portfolio

What makes a sustainable city?

Exposure

Exposure to climate change events

- Flooding
- Landslides
- Drought
- Temperature rise

Sensitivity

Sensitivity to exposure

- Economic resource
- Infrastructure
- Population pressure

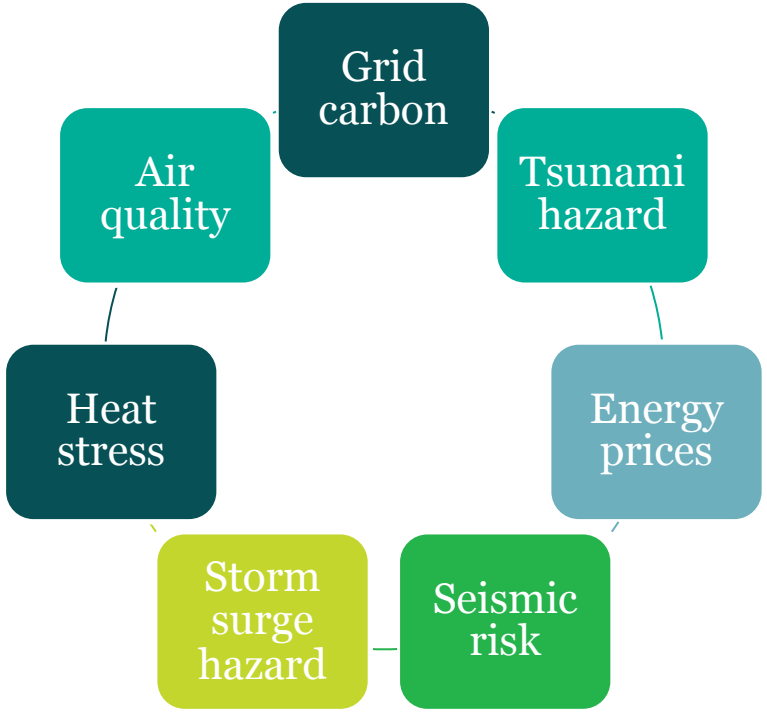
Adaptability

Capacity to adapt or take advantage

- Economy
- Society
- Institutions

Assessing climate change and environmental risk and opportunity

Additional indicators assessed?



Integrating Climate in the Investment Process

Transaction Sourcing & Vetting	Modeling Preparation	Allocation Process	Due Diligence	Investment Committee	Closing
• Screen investments for using climate risk tools.[1] • Consider capital investment required to meet Net Zero Carbon.	• Downside scenario analysis conducted in areas of high risk. • Consider capital investment requirements for meeting regulatory compliance.	• Climate risk research included in • Impact on portfolio climate exposure considered by interested funds. • **Preliminary IC meeting may be called to discuss climate-risk adjusted returns.**	• Business plan development includes mitigations. • Technical studies and utility data collection.	• Discussion of climate risk in IC memo. • Sustainability non-voting member of IC.	• Onboarding to include review of all ESG and climate research with asset team.

Key questions to be addressed in screening process

Question	How would this be answered?
Is the building resilient to climate change for the next 15 years? If not, can it be made resilient without damaging returns?	Site visit by engineering team who would be briefed in advance about anticipated changing climate conditions and asked to specifically address this.
What impact in value are the anticipated climate events likely to have?	Third party consultant to address this in report – specifically referring to historic impact of climate events on property value, likely availability of insurance in the future and potential impact of climate events on tenants. If the property value was to be impacted by climate events, would the desired return still be delivered?
Does the property price reflect the level of risk?	If there is significant climate risk present, is there a clear discount applied to take account of this risk? Can comparisons with similar properties in similar markets without the same level of risk be made to demonstrate this?
What other factors are there that might mitigate these risks?	Does the strength of the market offset the risk? Can specific insurance policies be taken out to mitigate risk? Is there planned investment into local defences?
Is there a maximum hold period given the increasing risk?	If the risk is predicted to increase significantly at a certain point in time, the sustainability team will recommend a shortened hold period.

Climate Data Procurement

Access to TCS Platform and Climate Risk Analysis Expertise

Ability to search individual locations for investment research and view pathway breakdown by drill down

Analysis of existing AUM configured by fund and investment strategy w/ identification of key insights

Market Impact Studies for a comprehensive view of indirect impacts to real estate values

- Liquidity
- Insurability
- Rental Market Growth

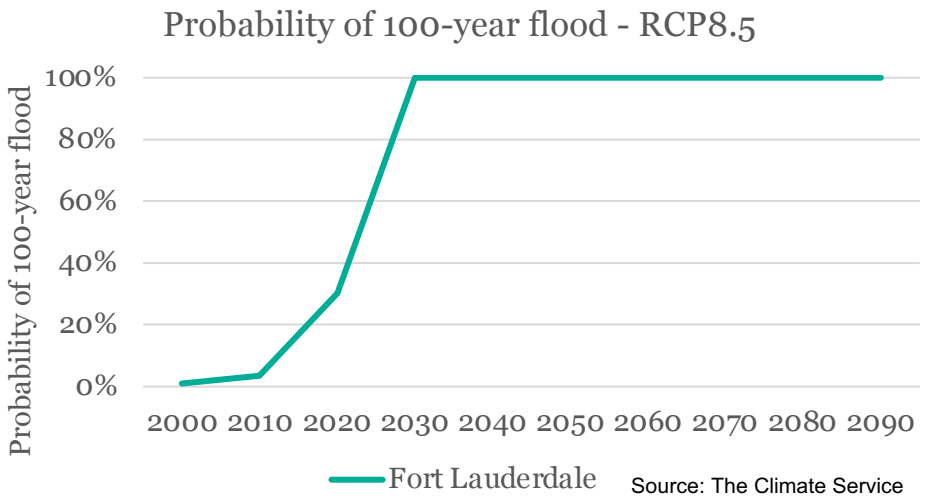
- Municipal Adaptation
- Building-level Adaptation
- Broad Economic Indicators

Deep Dive Regional Analysis high-risk locations

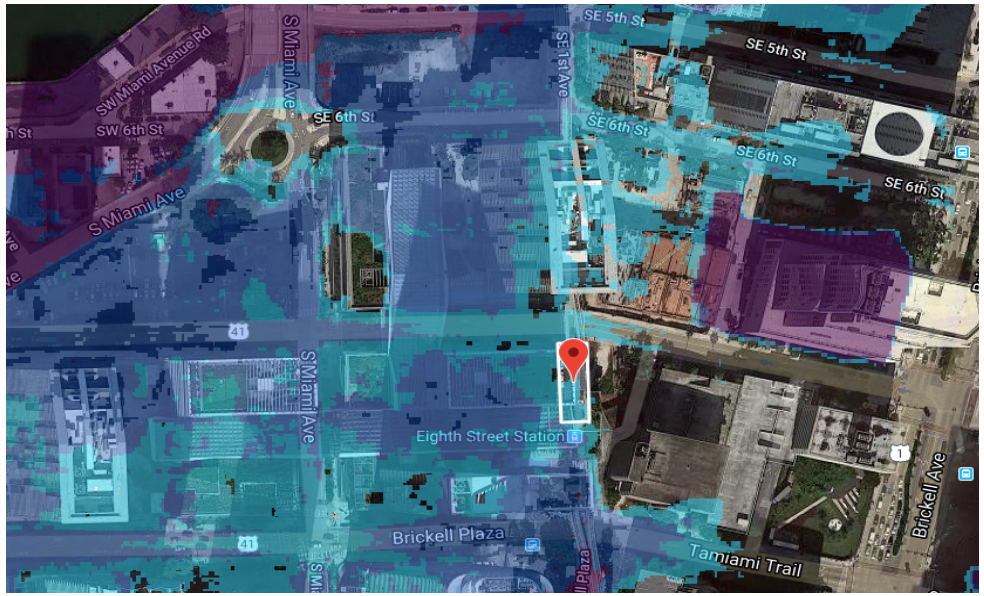
100 tactical markets ranked from lowest to highest risk

Miami Office in special flood plain

- FEMA Special Flood Hazard Insurance changes.
- Cap rate adjustments looking at a 20-year investment horizon.
- Resilience measures in place and market desirability
- Special IC discussion considering downside investment risk.



Source: The Climate Service

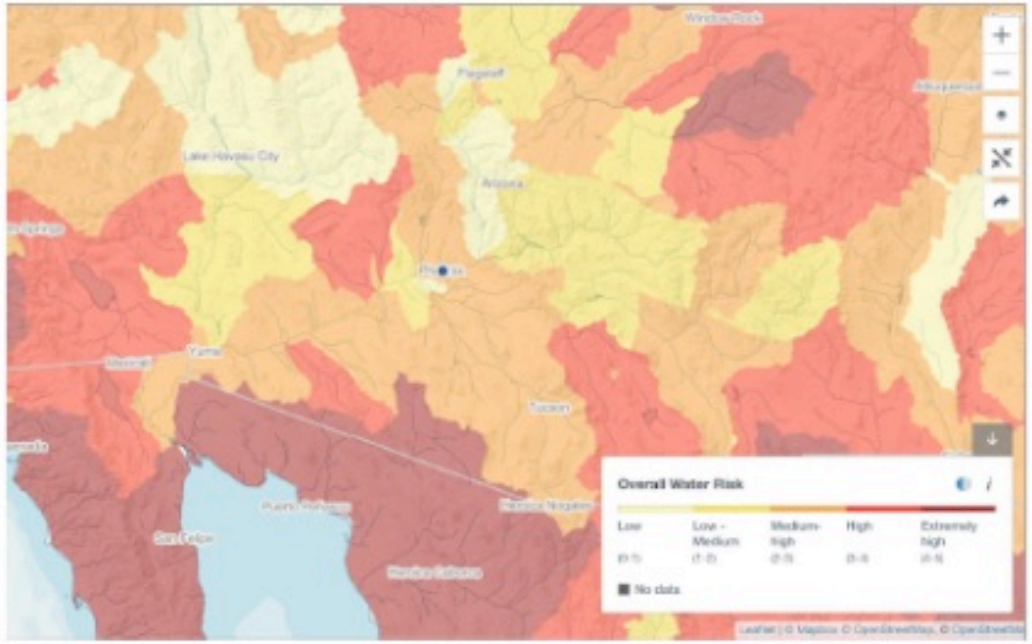


Source: Floodfactor.com

Office Asset Acquisition – Tempe, Arizona

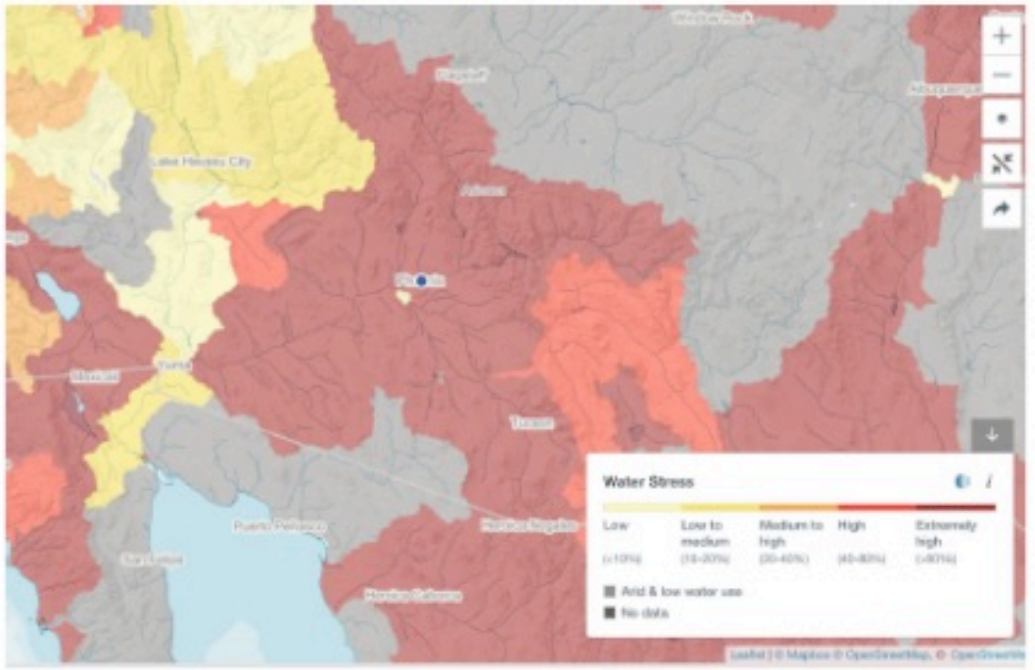
- Two property office acquisition in late 2019
- Client team requested information on water stress future risks
- Based on TCS feedback, added in resilience measures at end of 10-year projected hold

Water Stress Risk for Phoenix, AZ in the Baseline (2014) period.



Source: WRI Aqueduct Maps

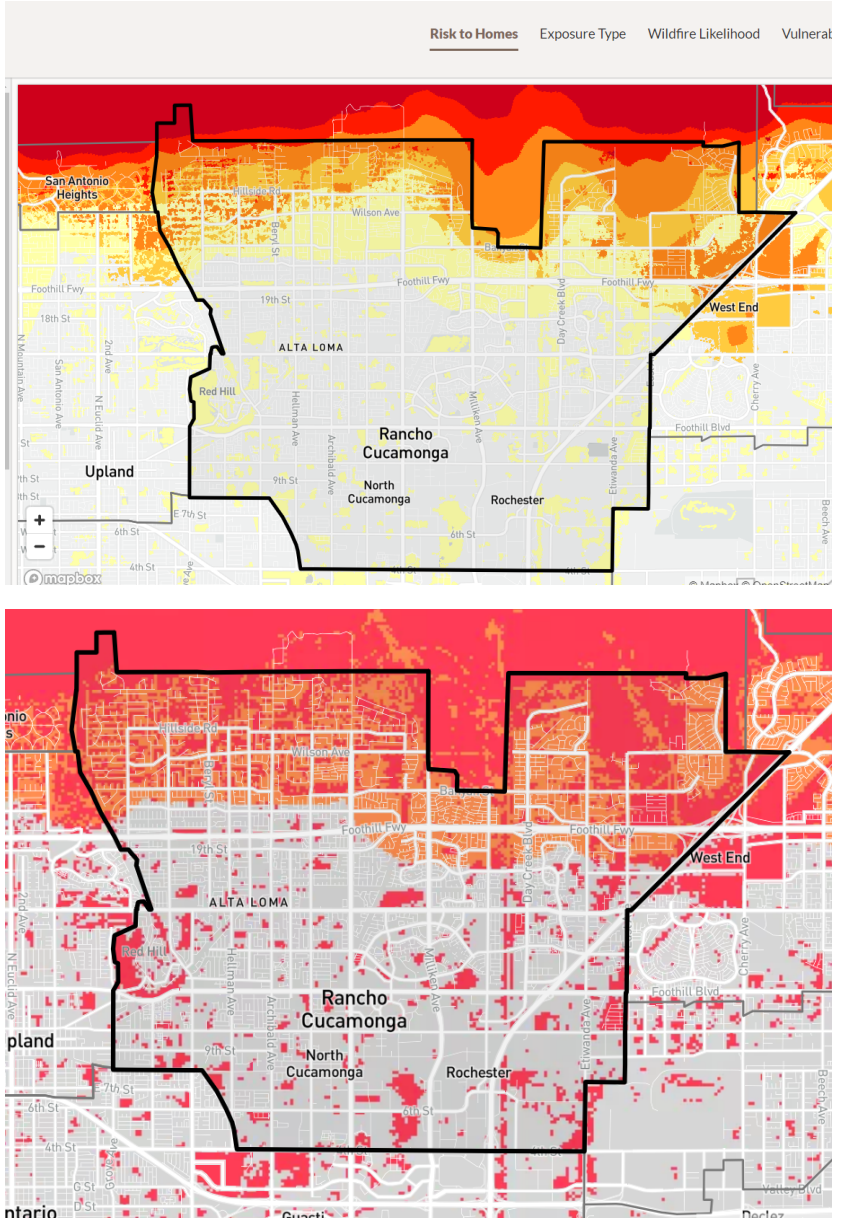
Water Stress Risk for Phoenix, AZ in the 2030s period.



Source: WRI Aqueduct Maps

Multifamily in Rancho Cucamonga

- Assessing risk of wildfire based on proximity to Wildland-Urban interface.
- Changes in insurance company treatment of wildfire risk.
- Climate data projecting how conditions that support wildfires will increase over time.
- Predicting quality of life & human behavior.



Source: wildfirerisk.org

Polling Question #3

Is insurance coverage and cost a factor in your climate change analysis?

- A key consideration
- Somewhat
- Very little
- What is insurance?

Polling Instructions

- Please go to www.sli.do
- Enter event code #: NAREIM
- Bam…technology!

LaSalle
INVESTMENT MANAGEMENT®

Kevin Scroggin
Global Head of Risk Management

Climate Risk Analysis

LaSalle's Climate Risk Analysis Initiative

- A multi-disciplinary/cross functional effort
  - Sustainability
  - Research and Strategy
  - Legal and Compliance
  - Risk Management

- Risk Management to coordinate the cat modeling work undertaken by insurance companies having important implications for LaSalle's climate change work
  - Historical database of events/outcomes
  - Climate change considerations being introduced
  - Outputs instructive for premium pricing and available limits– heightened importance given current insurance market conditions

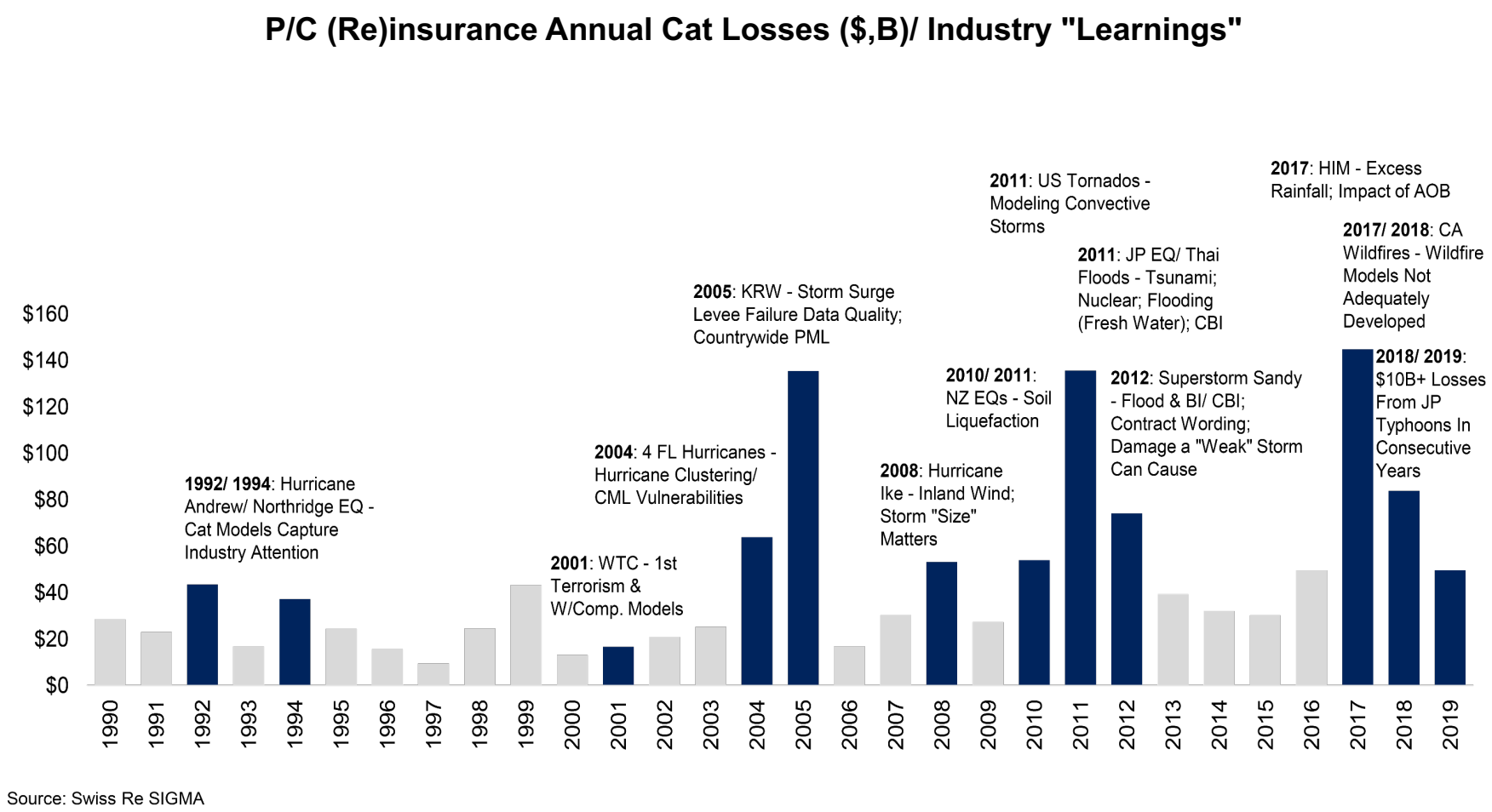
Coherent/Coordinated Approach to Climate Change - Validation

2.3 Climate risk management is not yet sufficiently embedded

Based on submissions and subsequent correspondence, it was evident that within many firms, this climate exercise was carried out by one team (eg risk department) with very limited input (if any) from other parts of the business. Cross-functional engagement will be essential if firms are to coherently assess the longer-term impacts under each of the scenarios, as it will be necessary to go beyond easily accessible data that is of limited use. Furthermore, the quality of the returns supplied for part 2 of the 2019 IST were, for many firms, poorer than that supplied for the Supervisory Statement (SS) 3/19: 'Enhancing banks' and insurers' approaches to managing the financial risks from climate change'.11 This reinforces our concern that climate-related work is not uniformly embedded across firms, and intra-firm communication channels are yet to be established (e.g. between actuarial, compliance and risk teams and across levels of seniority).

Source: Letter to Participating Firms from the Bank of England Prudential Regulation Authority
Subject: Stress Testing Climate Change/Natural Catastrophes (17 June 2020)

Insurance Industry Cat Modeling – Ever Evolving



Source: Swiss Re SIGMA

Trends Continue

AON AUGUST 2020 GLOBAL CAT RECAP

10-14 million Estimated number of damaged crop acres in Iowa (U.S.) following a major August 10 derecho

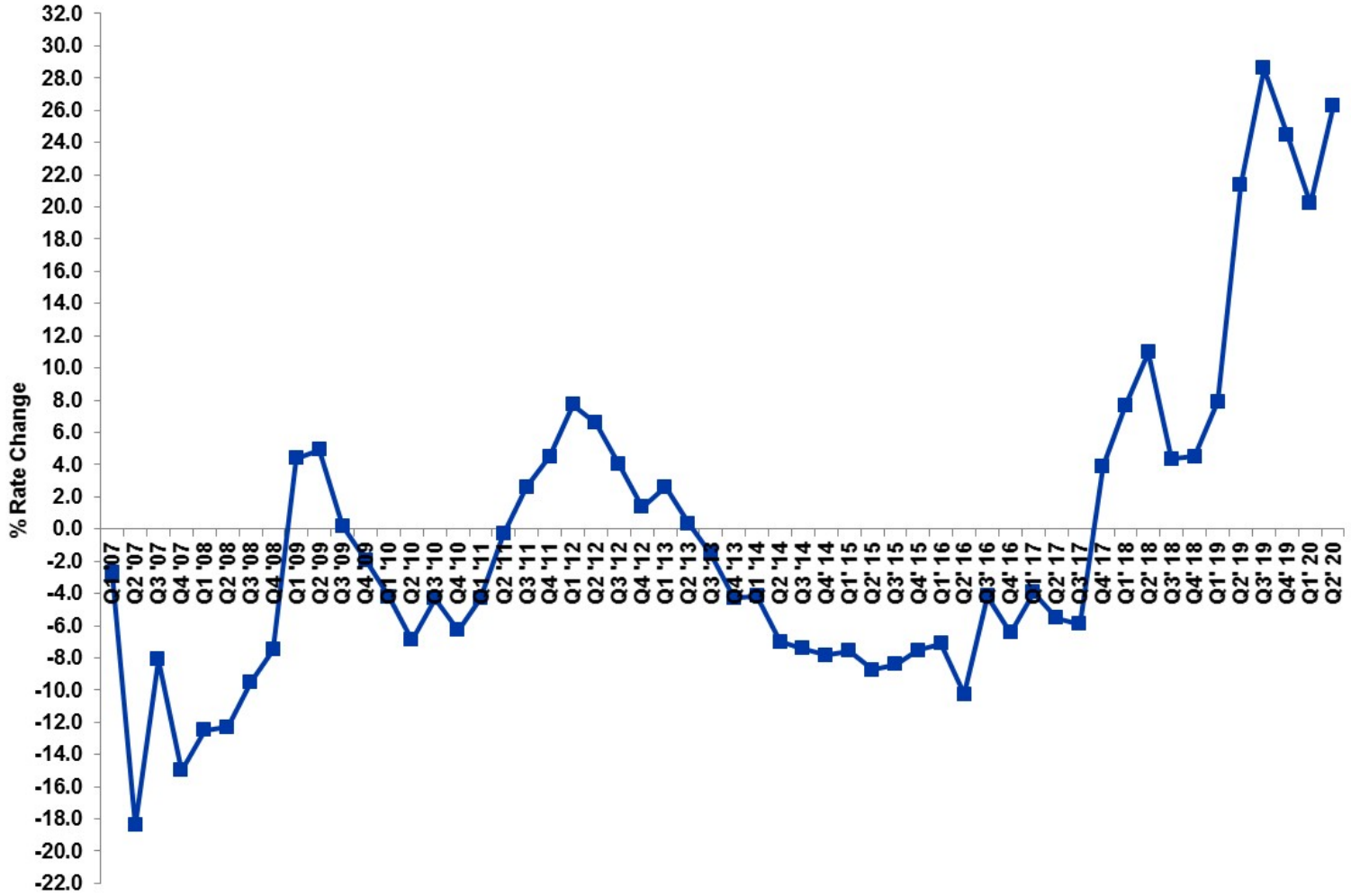
150 mph Landfall wind speed of Hurricane Laura; strongest tropical cyclone to strike Louisiana since 1856

9 Number of global tropical cyclones which made landfall during the month of August

130°F 54.4°C Temperature in Death Valley, CA (USA) on August 16; hottest reliable measurement ever recorded on Earth

S

Property – Quarterly Year-Over-Year Change In Average Rate

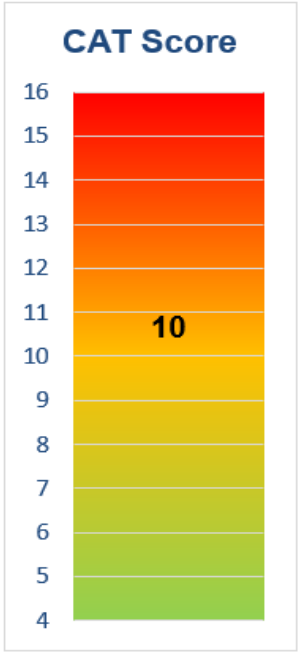


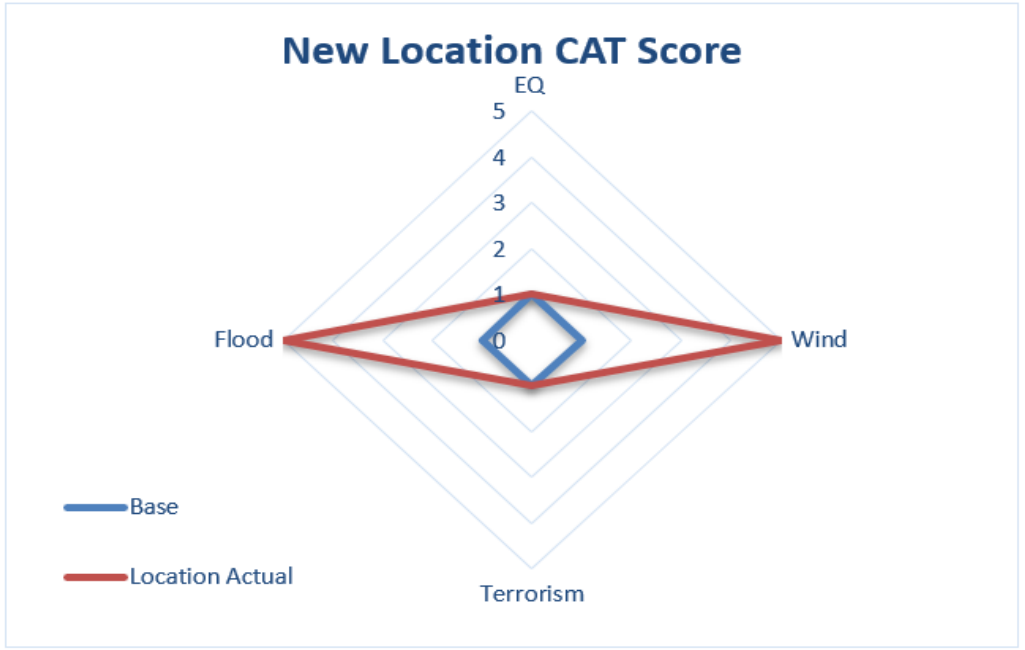
Empower Results®

LaSalle's 'Cat Score'

HIGH HAZARD WIND & AE FLOOD ZONE

ASSET INFO	
Category	**Data**
City	West Palm Beach
State	FL
County	Palm Beach County
Zip	33401
Value	$75,000,000
Flood Zone	AE
Combustible	NO
Sprinklered	YES
Occupancy	Apartment
Construction	NO





*Base - Low Hazard Flood Zone, No EQ Surcharge, No Wind Surcharge, Low Terrorism Risk

*Flood Zone - Check FZ in Impact On Demand Tool

Base Premium	CAT Adjusted Premium	Difference
$55,609	$353,935	$298,326

Climate Change – Implications for Insurance

- Insurance an important variable for investment decision making and portfolio management
  - Transaction supportive
  - Facilitates deal making with counterparties; borrowers, lenders, contractors, et al.
- Recent market conditions heightened concerns over insurance/premium costs– but a focus more than just costs
- Availability of insurance key importance
- Will revised cat modeling with climate change attributes restrict the insurability of certain assets, markets, geographies, etc?
- Also the risk duration “mismatch”– one-year insurance policies to address decades long climate risk exposures

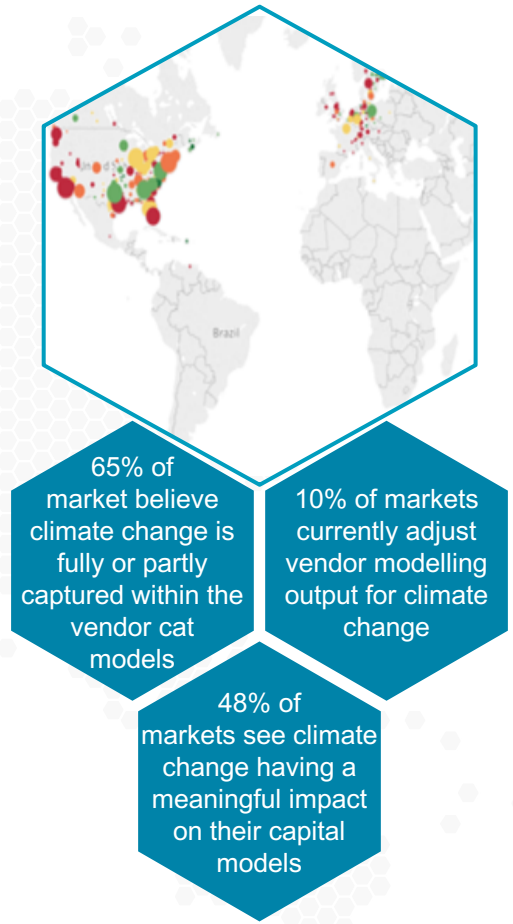
Multiple views of physical climate risk are needed

The role of catastrophe models

- Catastrophe models simulate disasters though our understanding of their historical occurrence based on a stable climate
- Catastrophe models can help identify
  - Capital management / balance sheet impact
  - Risk appetite
- We can measure frequency / severity change from current position based on climate scenarios
- Advancements in “Extreme Event Attribution” (EEA): “was this event influenced by climate change?”
  - “Risk-based approach”: probability of event occurrence correlating with climate change
  - “Storyline approach”: influence of climate change on thermodynamic processes leading to event
- Impact forecasting – in-house modelling
  - Simulate forecasted climate variation

Climate models describe the trend

- Cat models remain snap-shot views of risk
- Climate models downscale climate science into scenario-based narratives that describe physical and transition risk
- Translation of climate risk into financial metrics at an aggregate or per peril basis
- Different time horizons and scenarios illustrate critical decision pathways
- Can include physical and transition risk
- Allows implementation of climate science into investment and strategic decision making
- Enables risk consulting to align climate analytics into total cost of risk approach, balancing retention, risk control/mitigation, and transfer according to appetite
- Aligns to and must be led by governance approach



Source: Aon View of Risk Survey 2019

Short-Term
Climate Analytics & Solutions

Long-Term
Climate Resilient Strategies

Implementing scenario analysis and climate modelling to assess near and long term physical risk of climate change on capital management and strategic decision making

About

BentallGreenOak

$49 billion assets under management (USD) 12 spanning countries and 24 cities in premier real estate markets and centers of commerce in the world today.

GRESB 2019

UNEP FINANCE INITIATIVE

CANADA GREEN BUILDING COUNCIL · CONSEIL DU BÂTIMENT DURABLE DU CANADA ·

energy ENERGY STAR

PRI Principles for Responsible Investment

WHY & HOW OF CLIMATE RISK & RESILIENCE

Our approach to climate resilience stems from a continued focus on future-proofing our portfolios to drive long-term returns for our clients and investors.

We address climate risks at the property and portfolio levels through strategic planning that assesses and mitigates critical vulnerabilities.

Data Analytics

Portfolio Planning

Asset Management

Engagement

CaGBC WINNER GREEN BUILDING PIONEER

In partnership with RWDI, BentallGreenOak received the 2019 Green Building Pioneer Award at CaGBC's Ontario Green Building Excellence and Leadership Awards. The honor recognizes BentallGreenOak's approach to assessing and mitigating climate risk through the development of bespoke adaptation plans to enhance resiliency and safeguard them against climate risk.

TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

BentallGreenOak is proud to be one of the original participants in the United Nations Environment Programme Finance Initiative (UNEP FI) Task Force on Climate-related Financial Disclosures (TCFD) Real Estate pilot group in developing guidelines towards a first set of climate-related investor disclosures contributing to a harmonized industry-wide approach.

BentallGreenOak