



CLIMATE RESILIENCY PLAN

December 31, 2023

Prepared by: KM Sustainability



CREATING HEALTHIER, ENDURING ENVIRONMENTS.



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INTRODUCTION

M INTRODUCTION

CLIMATE CHANGE AFFECTS EVERY SECTOR OF OUR SOCIETY. AS THE IMPACTS OF CLIMATE CHANGE HAVE BEGUN TO MOVE FROM THE THEORETICAL TO REAL, ACTUAL EVENTS AND STRESSORS, BUILDING ORGANIZATIONAL RESILIENCE TO CLIMATE IMPACTS IS BECOMING EVER-MORE IMPORTANT.

Climate resilience and adaptation has historically been the domain of the public and non-profit sectors. However, private enterprise is now having to start taking into account many of the same considerations that the public sector has, building resilience is vitally important to companies.

This plan builds upon two frameworks:

- The HHS Health Sector Climate Pledge. Launched at Earth Day 2022, the pledge requires signatories to develop and release a climate resilience plan for continuous operations by the end of 2023 or within six months of signing the pledge, anticipating the needs of groups in their community that experience disproportionate risk of climate-related harm.
- The Taskforce on Climate-related Financial Disclosures (TCFD) and its successor standard, IFRS S2, now administered by the International Sustainability Standards Board and coming into effect in January 2024. The TCFD was launched in December 2015 with an aim to use financial disclosures as a means to inform investors and other stakeholders about the risks companies face related to climate change and how those risks are being managed. The distinction between physical and transition risk will be used in this report.

Part I, delivered at the end of December 2023, sets the stage by presenting an overview of Mazzetti and its operations, detailing the assumptions that the climate resilience plan is being developed under, and introducing a high-level climate risk assessment for transition and physical risks the company will face.

Part II continues and expands on the discussion by developing a more detailed climate vulnerability and risk assessment and then introducing strategies to assist Mazzetti in adapting and in building corporate resilience.



PART I

SETTING THE STAGE



COMPANY OVERVIEW

M COMPANY OVERVIEW



MAZZETTI IS A FORWARD-THINKING ENGINEERING CONSULTING FIRM WITH A STRONG FOCUS ON DESIGNING INNOVATIVE AND SUSTAINABLE SOLUTIONS FOR HEALTHCARE AND LIFE SCIENCES CLIENTS. MAZZETTI OFFERS A WIDE RANGE OF SERVICES TO HELP HEALTHCARE ORGANIZATIONS, RESEARCH FACILITIES, AND RELATED INSTITUTIONS PLAN, DESIGN, AND CONSTRUCT BUILDINGS AND INFRASTRUCTURE THAT MEET THEIR UNIQUE NEEDS.

Mazzetti's key areas of expertise include:



HEALTHCARE DESIGN: Mazzetti excels in healthcare facility design, taking into consideration the complex requirements of healthcare environments. They prioritize patient comfort, safety, and efficiency in their designs.



ENGINEERING SERVICES: The firm offers a variety of engineering services, including mechanical, electrical, plumbing, and sustainable engineering, to ensure that healthcare facilities are equipped with efficient and reliable systems.



SUSTAINABILITY: Mazzetti places a strong emphasis on sustainability and environmental stewardship. They work to incorporate green building principles and energy-efficient solutions into their projects to reduce environmental impact and operating costs.



TECHNOLOGY INTEGRATION: With the rapid advancement of technology in healthcare, Mazzetti helps clients integrate cutting-edge technologies into their facilities.



RESEARCH FACILITIES: Mazzetti has experience in designing research and laboratory spaces that meet the stringent requirements of scientific research, including compliance with safety regulations and the creation of flexible, adaptable spaces.



ENERGY MANAGEMENT: The firm is committed to helping clients manage energy consumption and reduce carbon footprints by implementing energy-efficient systems and renewable energy solutions.

Mazzetti collaborates closely with its clients to understand their specific needs and goals. The company works with architects, healthcare professionals, and other stakeholders to create customized, innovative solutions that support the delivery of high-quality services.

Mazzetti is a certified Benefit Corporation known for its commitment to sustainability, equity, and corporate social responsibility. Mazzetti often participates in initiatives and projects aimed at improving the environmental and social impact of its operations.

M COMPANY OVERVIEW

RECENT HISTORY

With the onset of the COVID-19 pandemic in March 2020, the world changed, and Mazzetti changed with it. As so many others did, the company went fully remote, and was able to continue operations effectively.

As of December 2023, Mazzetti's physical offices are concentrated in the western United States:

- California (San Francisco, Huntington Beach, Sacramento)
- Oregon (Portland, Eugene)
- Washington (Seattle)
- Colorado (Denver)
- Missouri (St. Louis)
- Tennessee (Nashville)
- Georgia (Atlanta)
- Another office is located in Bangalore, India.

The majority of Mazzetti's employees work remotely on a regular basis. Most of Mazzetti's physical locations are co-located with WeWork facilities. The leases on most of the remaining physical locations are not expected to be renewed and would be replaced by space in similar co-working facilities.

Just as Mazzetti has made sustainability integral to its operations as a company, it intends to do the same with climate resilience. It is also working to introduce climate resilience as a service offering to clients in response to a growing need to adapt to current and future climate-related impacts.





CLIMATE ASSUMPTIONS

M CLIMATE ASSUMPTIONS

CLIMATE CHANGE IS CAUSED BY INCREASING EMISSIONS OF SPECIFIC GASSES, PRIMARILY CARBON DIOXIDE (CO₂) AND THE FEEDBACK LOOPS CAUSED BY THOSE EMISSIONS INCREASING OVERALL GLOBAL TEMPERATURES.

As of December 2023, current concentrations of CO₂ in the atmosphere are equivalent to those last seen in the Pliocene era between 2 and 5 million years ago before the Ice Ages, where global sea levels were on average 20 feet higher than today.

Climate change is best thought of as, in security parlance, a threat multiplier, or as “loading the dice”, amplifying the impacts of existing hazards, shifting the probability of extreme events, and extending new hazards to regions that previously have not experienced them.

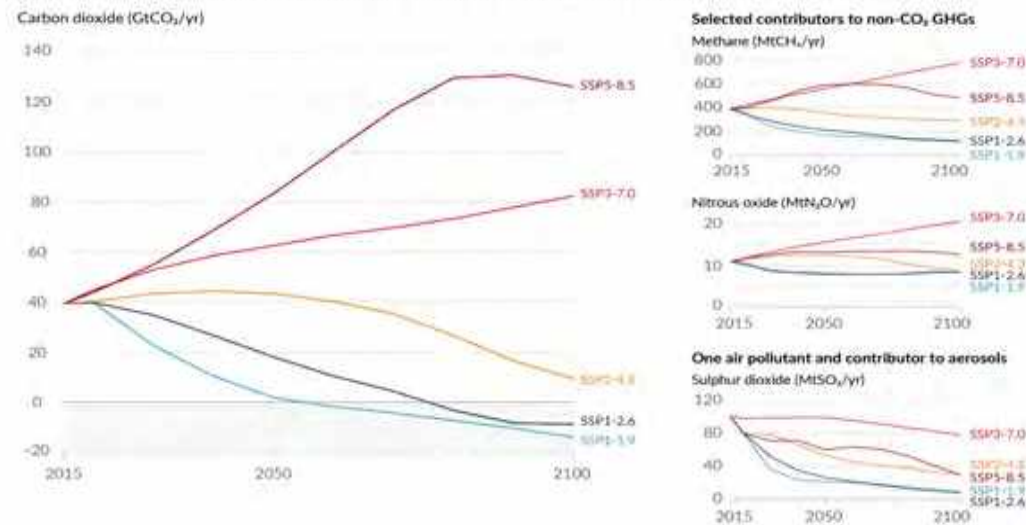
National and intergovernmental efforts to establish consensus climate projections include the Intergovernmental Panel on Climate Change and the National Climate Assessment in the United States. The IPCC uses a representative concentration pathway (RCP) and associated shared socioeconomic pathways (SSP) to illustrate likely outcomes of varying emissions levels.

At the time of writing, given national pledges and observed trends in measurable emissions, the most probable emission scenario is the upper end of RCP4.5, which results in an increase of between 2.2 and 3.5 degrees Celsius over preindustrial temperatures by 2100, a significant increase by any measure over the 1.5 degree Celsius boundary set by the 2015 Paris Accords. This outcome is subject to several significant caveats:

- This assumes that all national pledges are followed through upon, which is highly questionable given political realities.
- This also neglects the potential for feedback loops or unpredictable events such as major methane releases due to arctic thawing that may temporarily significantly increase greenhouse gases in the atmosphere.

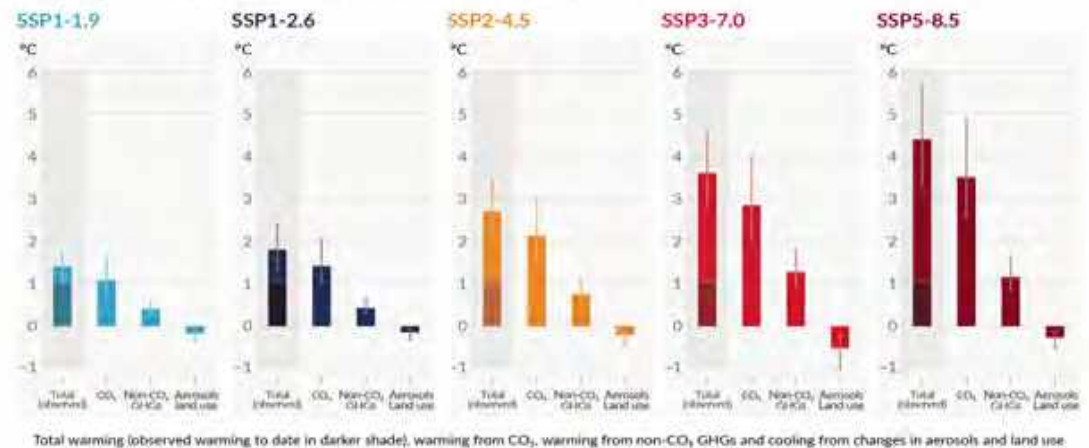
Future emissions cause future additional warming, with total warming dominated by past and future CO₂ emissions

(a) Future annual emissions of CO₂ (left) and of a subset of key non-CO₂ drivers (right), across five illustrative scenarios



(b) Contribution to global surface temperature increase from different emissions, with a dominant role of CO₂ emissions

Change in global surface temperature in 2081–2100 relative to 1850–1900 (°C)



Total warming (observed warming to date in darker shade), warming from CO₂, warming from non-CO₂ GHGs and cooling from changes in aerosols and land use

M CLIMATE ASSUMPTIONS

- Many projections assume the development and widespread use of carbon capture and sequestration (CCS) technology to draw down carbon out of the atmosphere. As of yet, CCS technology has not been proven to scale, and the extent of deployment required for CCS to impact projections will be extraordinarily broad and expensive.
- Finally, a consensus is not a prediction – it is a product of a scientific process that is heavily impacted by political considerations. It can be thought of as a set of ranges, not as a hard number.

Best practice for climate risk analysis today uses RCP8.5, or “business-as-usual” (BAU) projections as their baseline, which was the most likely outcome as of as little as three years ago. More recent projections have shifted closer to RCP4.5, but RCP8.5 is still completely in the realm of possibility and is more likely than the extremely optimistic projection of RCP1.9.


Under a business-as-usual (BAU) high emission scenario, climate models project that North America is likely to experience significant climate changes by 2045, including:

- Average temperatures across North America are projected to rise between +2°C to +3°C beyond pre-industrial levels. Heat waves across the continent are likely to intensify, last longer, and occur with greater frequency. Some inland regions could see 30 to 40 more days per year with high temperatures above 90°F.
- While total annual precipitation may increase modestly, seasonal rainfall patterns are forecasted to change significantly. Winters may see more precipitation in the northern states and Canada, while the Southwest U.S. could experience prolonged droughts, receiving up to 30% less winter rain and snowpack vital for water reserves. The changing distribution of rain vs. snow in Western mountain ranges will significantly impact water supply throughout the region.
- The frequency and severity of extreme storms are projected to rise, fueled by warmer seas and temperatures. Atlantic hurricanes could intensify by over 25 mph for every 2°F of warming. Inland flooding events are forecast to worsen due to increased intensity of precipitation events. The frequency and intensity of wildfire is likely to intensify across western North America due to hotter and drier conditions.
- Accelerating ice sheet melt and seawater expansion from ocean warming is projected to boost sea levels by 12-24 inches by 2045 relative to 2000 levels. This will make coastal communities much more vulnerable to storm surge flooding and saltwater intrusion far inland along rivers.

Below are a few of the most relevant aspects of climate change for resilience planning:

- Many of climate change’s impacts have resulted in greater unpredictability. For example, many regions are projected to experience both too little rain (increasing droughts) and too much rain (in severe events such as rain bombs or atmospheric rivers). Averages tend to obscure these kinds of extremes. Increasingly over the past several years, these kinds of almost stochastic events have increased all over the world.
- Projections by their nature tend to assume steady, linear change. Given what has been observed above, this is unlikely on either a local scale or a macrolevel scale. It should be assumed that surprises are likely to occur, and organizations should plan accordingly.
- While overall climate projections have been remarkably accurate in terms of global temperature, many of the impacts of these temperature rises have been faster than expected, in some cases significantly so, with observed phenomena occurring today that researchers expected to see decades later. Planners should assume that impacts will occur on shorter time scales than anticipated – acting sooner will save money, time, and effort later.



A city skyline at sunset with a large sun in the sky. The sun is a bright, glowing orb in the upper center of the frame, casting a warm, golden light across the sky and the city below. The city skyline is visible in the lower half of the image, with various skyscrapers and buildings silhouetted against the bright sky. A dark green rectangular box is overlaid on the right side of the image, containing the title text in white. A thin white horizontal line runs across the middle of the image, passing behind the green box.

HIGH-LEVEL CLIMATE RISK ASSESSMENT

M HIGH-LEVEL CLIMATE RISK ASSESSMENT

AS A SOON-TO-BE FULLY REMOTE ORGANIZATION, MANY OF THE TRADITIONAL METHODS OF EVALUATING ORGANIZATIONAL CLIMATE RISK ARE LESS DIRECTLY RELEVANT TO COMPANY OPERATIONS.

An organization without leased space faces fewer physical risks to the company's assets (although not completely – see the forthcoming Part II of this report). Conversely, an organization without leased office space has a greater reliance on infrastructure and systems that it does not completely control. This makes understanding those relationships vital, as well as developing innovative methods to reduce risk and increase resilience.

The TCFD framework on transition vs. physical risks does still apply in important ways, however, and the report will follow this distinction by breaking the climate risk assessment into two parts: a) Overall/transition risks and b) Physical risks. Overall/transition risk refers to the legal, social, and economic environment that Mazzetti and its clients operate in, while physical risks include natural risks that directly impact Mazzetti people or assets.

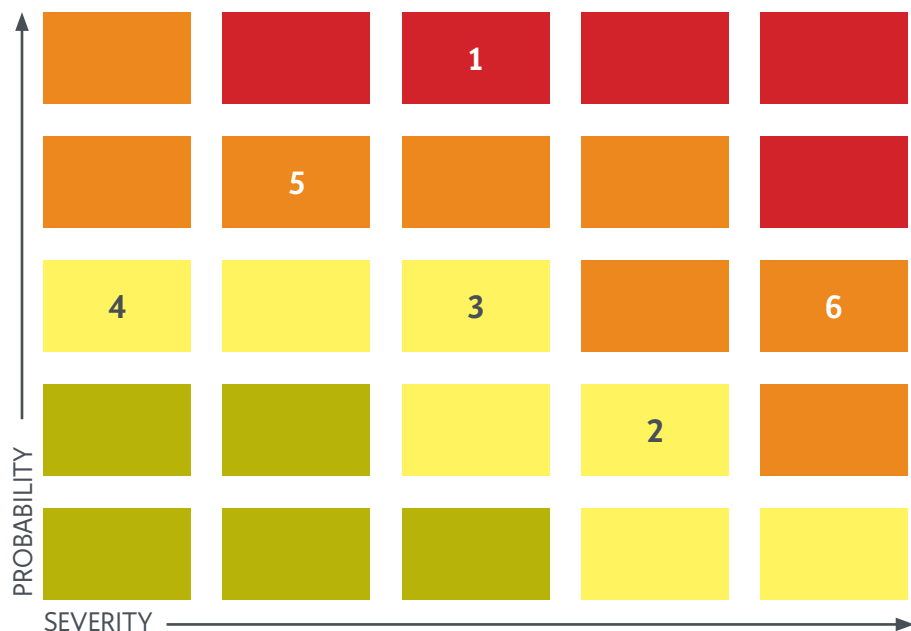
OVERALL/TRANSITION RISKS

It is difficult to predict in detail the economic, social, and regulatory environment Mazzetti will be operating in over the next twenty years. This report will limit to focusing on a view of the future related to climate. However, climate impacts are certain to grow in scope to impact all of the areas noted above – economic, social, and regulatory. As noted earlier, climate will largely act as an additional stressor or multiplier in many seemingly unrelated areas.

For example, population shifts between census tracts in many areas of the U.S. Sunbelt due to climate impacts are already occurring according to a December 2023 report by the First Street Foundation. The vast majority of moves, however, would not describe themselves as climate-centered, but as real estate transactions with neighborhoods less susceptible to flooding being valued more highly than those that are more susceptible. In the next two decades, this trend is almost certain to accelerate. Similarly, the recent moves by insurers to exit certain markets and to significantly raise rates in others are still often thought of as due solely to extreme weather exposure with little reference to why that exposure is growing and will continue to grow.



M HIGH-LEVEL CLIMATE RISK ASSESSMENT



- 1 Overall economic issues - markets, insurance
- 2 Strain on government budgets
- 3 Public health challenges (disease, etc.)
- 4 Cascading system breakdown
- 5 Population shifts
- 6 Regulatory changes

- **ECONOMIC ISSUES** – These include annual losses to GDP mounting into the hundreds of billions from coastal property damage and wildfire, labor productivity declines, severe storm impacts, heat-related health effects, increases in insurance rates and uninsurable properties, and more.
- **STRAIN ON GOVERNMENT BUDGETS** – This includes increased demand on government coffers to support rebuilding infrastructure, emergency response, and disaster management, among others.
- **PUBLIC HEALTH CHALLENGES** from expanding disease vectors like mosquitos and ticks now able to thrive farther north, as well as increasing risk of malnutrition with unstable crop yields.
- **CASCADING SYSTEM BREAKDOWNS** from extreme heat, flooding, storms overburdening patchwork systems. This is a more abstract and harder-to-define risk, akin to “cumulative impacts” as defined by the National Environmental Policy Act – systemic issues become more likely as broader risks grow.
- **POPULATION SHIFTS** – Many regions and cities seeing strong inbound migration from climate-stressed locales, challenging urban capacity.
- **REGULATORY CHANGES** – As climate stress increases, so too does the likelihood of regulatory and policy changes related to climate resiliency, disaster preparedness and straining municipal services further complicating projects. This may also be an opportunity for a well-prepared company.

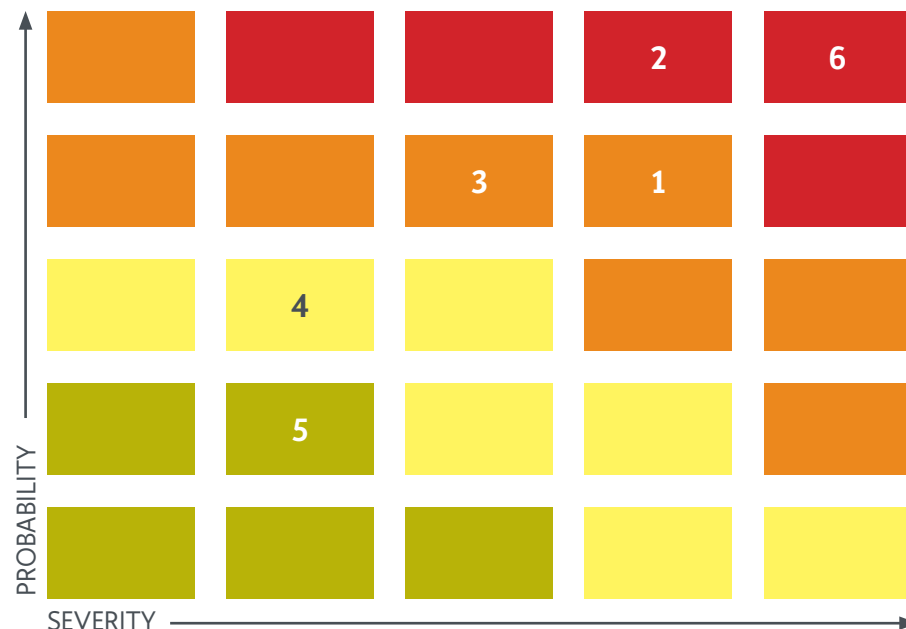
M HIGH-LEVEL CLIMATE RISK ASSESSMENT

PHYSICAL RISKS

Physical risks are direct impacts on company assets, systems, and supporting infrastructure. The more detailed vulnerability and risk assessment in Part II discusses specific climate risks such as extreme rainfall events and their impact on specific categories of assets, but this high-level assessment classifies risks by category to the functioning of Mazzetti as a company.

Mazzetti is more than the sum of its assets. As the company goes increasingly virtual, assets that the company does not fully control, such as the Internet and associated global communications, become that much more essential to the company's existence. Therefore, any climate risk assessment that will be meaningful to Mazzetti must go beyond traditional resilience or hazard mitigation approaches focusing on individual physical assets to a consideration of those broader systems as integral to the company's operation.

- **EXTREME WEATHER EVENTS** – These include specific extreme weather events such as extreme rainfall (atmospheric rivers, rain bombs), wildfire, hurricanes and other storms, and heat waves.
- **CHRONIC CLIMATE STRESSORS** – This includes longer-term stressors that amplify individual events and cumulatively increase stress on systems such as sea-level rise, average temperature changes, and drought.
- **STRAIN ON ELECTRIC INFRASTRUCTURE** - Reliable electricity is foundational to the modern high-tech remote company. Without power, very little else matters. This includes the strain on the power grid and potential for brownouts or blackouts.
- **STRAIN ON INTERNET AND CONNECTIVITY** - The Internet is based on physical architectures of servers, data centers, cables, and networks, all of which are vulnerable to both acute climate events and climate stressors.
- **STRAIN ON TRANSPORTATION** – Transportation to both co-working facilities and to client sites is a necessity for project delivery. Both rely on smoothly functioning transportation infrastructure, something that will come under increasing strain due to both acute and chronic events.
- **FINANCIAL COSTS** – Mazzetti will still face expenditures for its IT infrastructure as well as physical equipment for workers, potential increased health insurance expenses due to climate impacts. Heightened insurance premiums and lending rates as they impact Mazzetti as well as its clients, as well as demand fluctuations as clients assess the economic viability of long-range ventures under mounting environmental uncertainty.



- 1 Extreme weather events - rainfall, storms, heat waves
- 2 Chronic climate stressors - drought, sea level rise
- 3 Strain on electric infrastructure
- 4 Strain on internet and connectivity
- 5 Strain on transportation
- 6 Financial costs - insurance, additional spending

M HIGH-LEVEL CLIMATE RISK ASSESSMENT

PREVIEW OF GENERAL RESILIENCE STRATEGIES

Mazzetti's goal of operating virtually offers many strengths and advantages in terms of climate resilience. Reducing the physical footprint of the organization and effectively distributing it among hundreds of home offices and several shared spaces changes the risk profile of the organization. While on the one hand the distributed nature of home offices reduce the overall impact of individuals being unable to work (an event in one geographic area could impact fewer employees and allow others outside of the area to fill in and continue work), it greatly increases the number of individual points of failure.

Strategies will fall under two main categories:

PHYSICAL – encouraging employees to understand their localized climate risk and to take measures to mitigate against it. This may involve corporate assistance from Mazzetti, akin to how companies ensure that remote workers have uniform technology to enable them to do their jobs.

SYSTEMS – reliable power and internet connectivity are essential to the existence of a virtual, remote-based company. Mazzetti will need to examine ways to build redundancy into its systems, processes and networks, as well as to isolate points of failure in the event of major events.



PART II

HAZARDS & STRATEGIES



ASSETS AND PROCESS INVENTORY

ASSETS AND PROCESS INVENTORY

PHYSICAL ASSETS - OFFICE SPACE

Mazzetti's main physical assets are our leased office space and coworking spaces. Inside the physical footprint of the company, physical assets include office furniture and equipment such as desks, chairs, conference room furnishings, and any decorations or branding elements. IT assets include company-owned computers, servers, networking equipment, printers, and other peripherals that are essential for daily operations.

As of February 2024, our physical locations are all located in the United States, with the exception of an office in India:

CALIFORNIA

- San Francisco (220 Montgomery St, San Francisco, CA 94104)
- Huntington Beach (7777 Center Ave, Huntington Beach, CA 92647)
- Sacramento (3600 American River Dr #203, Sacramento, CA 95864)

OREGON

- Portland (121 SW Salmon St, Portland, OR 97204)
- Eugene (940 Willamette St #310, Eugene, OR 97401)

WASHINGTON

- Seattle (2013 4th Ave, Seattle, WA 98121)

COLORADO

- Denver (2590 Welton St, Denver, CO 80205)

MISSOURI

- St. Louis (8112 Maryland Ave, Clayton, MO 63105)

TENNESSEE

- Nashville (393 Nichol Mill Ln, Franklin, TN 37067)

GEORGIA

- Atlanta (1175 Peachtree St NE, Atlanta, GA 30361)

BANGALORE, INDIA (Level 14, & 15, UB City, Concorde Towers, 1, Vittal Mallya Rd, KG Halli, D' Souza Layout, Ashok Nagar, Bengaluru, Karnataka 560001, India)


In co-working spaces not wholly leased by Mazzetti, the company still has portable assets such as laptops, mobile devices, portable projectors, and other mobile technology that employees use in these shared environments. Other physical assets could include marketing materials like banners, stands, and product samples that are used for presentations or meetings held at these co-working spaces.

Employee home offices are not officially owned by the company but should be considered as part of an overall corporate climate resilience strategy. Home offices can vary greatly, from dedicated rooms to a laptop and a portable desk set up anywhere in either a home or another offsite location. Those spaces are almost impossible to standardize, but are, in a real sense, physical assets for Mazzetti.

PROCESSES SUPPORTING REMOTE WORK



Our operations are supported by the infrastructure of the modern Internet, and by corporate processes enabling the company to operate largely remotely. Components include:

- **IT HARDWARE USED BY EMPLOYEES** – laptops, desktop computers, monitors, phones and other electronic devices. In the event that employees download apps such as Outlook onto their phones, their personal devices are tied into the corporate IT infrastructure.
- **IT INFRASTRUCTURE** – Our operations are largely cloud computing-based. Cloud computing relies on pooling together resources from server farms and data centers and distributing computing operations across multiple physical servers. This also includes backup procedures in the event of an interruption or failure of infrastructure.
- **BROADBAND AND COMMUNICATIONS INFRASTRUCTURE** – to move data from place to place, physical infrastructure is required in the form of wires or data broadcast.
- **IT SUPPORT** – IT support to solve issues as they emerge.
- **PROCEDURES** – less tangible but vital for enabling Mazzetti to function as a remote organization, the procedures and guidance governing remote work is a part of the remote infrastructure.

An aerial photograph of a large-scale solar farm. The image shows rows of solar panels being installed on a flat, light-colored ground. Several workers wearing yellow hard hats and safety gear are visible, some standing and others working on the panels. A semi-transparent blue rectangular box is overlaid on the right side of the image, containing the title text in white. The solar panels are arranged in a grid pattern, with some sections already fully installed and others still under construction.

HAZARDS AND VULNERABILITY ASSESSMENT

M HAZARDS AND VULNERABILITY ASSESSMENT

COUNTRY	STATE	CITY	ADDRESS	MAJOR PHYSICAL CLIMATE RISKS OVER NEXT 10 YEARS
United States	California	San Francisco	220 Montgomery St, San Francisco, CA 94104	 
United States	California	Huntington Beach	7777 Center Ave, Huntington Beach, CA 92647	  
United States	California	Sacramento	3600 American River Dr #203, Sacramento, CA 95864	   
United States	Oregon	Portland	121 SW Salmon St, Portland, OR 97204	   
United States	Oregon	Eugene	940 Willamette St #310, Eugene, OR 97401	   
United States	Washington	Seattle	2013 4th Ave, Seattle, WA 98121	  
United States	Colorado	Denver	2590 Welton St, Denver, CO 80205	  
United States	Missouri	St. Louis	8112 Maryland Ave, Clayton, MO 63105	 
United States	Tennessee	Nashville	393 Nichol Mill Ln, Franklin, TN 37067	 
United States	Georgia	Atlanta	1175 Peachtree St NE, Atlanta, GA 30361	 
India	Karnataka	Bangalore	Level 14, & 15, UB City, Concorde Towers, 1, Vittal Mallya Rd, KG Halli, D' Souza Layout, Ashok Nagar, Bengaluru, Karnataka 560001	 

M HAZARDS AND VULNERABILITY ASSESSMENT

PHYSICAL RISKS

STORMS

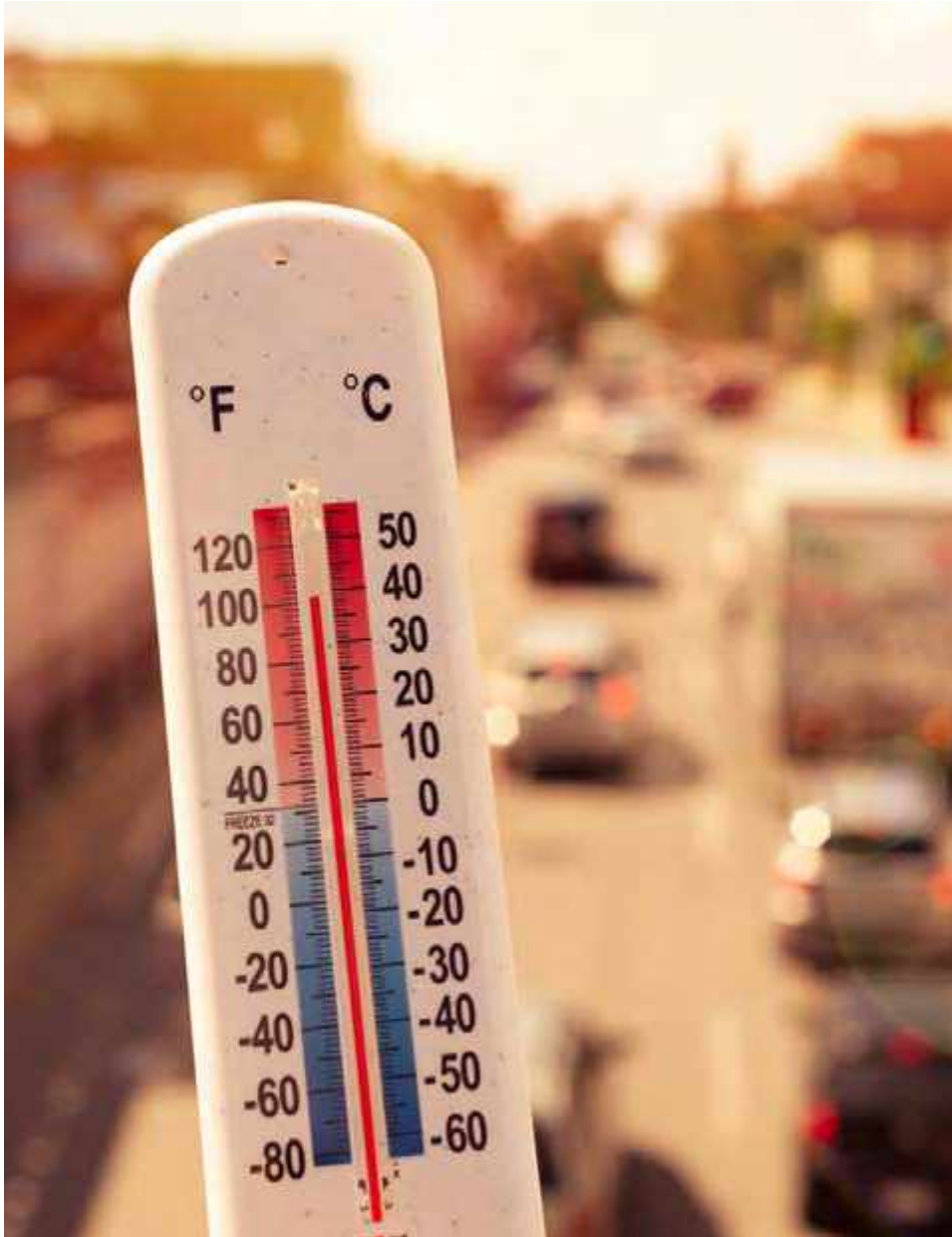
- Direct impacts primarily involve the physical infrastructure that supports the company's operations, even if its workforce is distributed. Critical facilities like data centers, cloud infrastructure, and network nodes may be located in areas vulnerable to storms, risking damage that can lead to data loss, compromised security, and service outages. For employees working remotely, storms can disrupt power and internet services, severely hampering productivity and access to necessary digital resources.
- Indirect impacts of storms include disruptions to supply chains and third-party services crucial for the company's operations. Moreover, the increased frequency and intensity of storms, a consequence of climate change, can lead to higher insurance premiums and potential difficulties in securing coverage for certain risks.

WILDFIRES

- Even if Mazzetti does not own and operate extensive physical facilities, critical aspects of our infrastructure, such as data centers, cloud servers, and telecommunications networks, could be located in or near wildfire-prone areas. Wildfires can damage or destroy these physical assets, leading to data loss, security breaches, and disruptions in service availability.
- Wildfires often lead to power outages and damage to communication infrastructure. Employees in affected regions may find themselves without internet access and electricity, significantly hindering their ability to work.
- The health effects of wildfires on employees can be significant, ranging from respiratory issues due to smoke inhalation to the psychological stress associated with evacuation orders or loss of property. Such health concerns can lead to increased absenteeism and reduced productivity.
- The increasing frequency and intensity of wildfires can lead to higher insurance premiums and potentially limited coverage for wildfire-related damages.



M HAZARDS AND VULNERABILITY ASSESSMENT



EXTREME HEAT

- Extreme heat can strain cooling systems and increase the risk of power outages, as seen in the United Kingdom in 2022 when data centers used by Google and Oracle went offline briefly during record-breaking temperatures of 104.4 degrees Fahrenheit. For remote-first companies, this can mean disruptions in operations, data loss, and communication breakdowns if backup systems fail.
- Data centers consume significant amounts of energy for cooling. According to the International Energy Agency, data centers worldwide use about 200 terawatt-hours of electricity annually, roughly 1% of global electricity demand. During heatwaves, the demand for cooling increases, potentially leading to higher operational costs and, in worst-case scenarios, thermal shutdowns to prevent equipment damage.
- For every degree Celsius increase in temperature above 26°C (78.8°F), productivity can drop by as much as 2%. For remote employees, the lack of an optimally controlled work environment can exacerbate these effects, potentially leading to decreased output and higher rates of errors.
- With the rise of extreme weather events, insurance premiums for businesses are expected to increase. Companies may also face increased liability risks if they fail to provide adequate support for employees working in unsafe conditions due to heat.

M HAZARDS AND VULNERABILITY ASSESSMENT

CHRONIC CLIMATE STRESSORS

DROUGHT

- Data centers consume significant amounts of water for cooling purposes, with the U.S. data centers using an estimated 626 billion liters of water annually, according to the International Energy Agency. Drought conditions can lead to restrictions on water use, affecting these operations' efficiency and cost.
- Drought conditions can exacerbate air quality issues, leading to increased respiratory problems and allergies.
- For employees in drought-stricken areas, water scarcity can lead to personal and domestic challenges, including restrictions on water use and increased costs for water.

SEA LEVEL RISE

- Coastal data centers and infrastructure supporting internet and cloud services are at risk from sea level rise. One study estimated that more than 4,000 miles of fiber optic cables in the U.S. are at risk of being underwater within the next 15 years. This could lead to increased latency or disruptions in services critical for remote-first operations.
- Insurance premiums in many coastal areas are rising. According to the First Street Foundation, flood insurance premiums might need to increase by 4 to 5 times to reflect the current risk, with even greater increases as sea levels continue to rise.
- Employees living in coastal areas affected by sea level rise may face displacement or increased commuting difficulties due to frequent flooding, impacting their productivity and ability to work remotely.
- Floods are a leading cause of power outages. The U.S. Department of Energy reports that between 2003 and 2012, 58% of power outages were weather-related, with flooding being a significant contributor. For remote employees, power outages can lead to loss of work time and data, affecting productivity and business operations.



HAZARDS AND VULNERABILITY ASSESSMENT

STRAIN ON ELECTRIC INFRASTRUCTURE

- During heatwaves, electricity demand surges, primarily due to the increased use of air conditioning. Electricity demand can spike by over 40% in cities across the United States during the summer months.
- The American Society of Civil Engineers (ASCE) 2021 Report Card for America's Infrastructure gave the U.S. energy infrastructure a grade of C-, highlighting its vulnerability. For example, Hurricane Sandy in 2012 caused power outages for over 8.5 million customers in the Northeastern United States.
- Much of the electric grid in developed countries is decades old and not designed for the current climate reality or the increased load from digital economies. The World Economic Forum reports that the average age of power plants in developed countries is over 30 years, with much of the grid infrastructure older. Older infrastructure is more prone to failures during extreme weather events, leading to increased maintenance costs and higher risks of unexpected power outages.

STRAIN ON INTERNET AND CONNECTIVITY

- Data centers are only one component of the systems that create the Internet. One study estimates that thousands of miles of fiber optic cables and other critical internet infrastructure in U.S. coastal cities are at risk of being submerged due to rising sea levels within the next 15 years. Most fiber-optic cable on land is within three feet of the surface, and while it is built to be weather and water-resistant, it is not designed for repeated extreme weather events. Hurricane Sandy in 2012 left millions without internet access by flooding networks in New York and New Jersey.
- During natural disasters or pandemics, internet usage spikes dramatically. For instance, at the onset of the COVID-19 pandemic, internet traffic surged by 25-30% in many regions, according to reports from internet infrastructure providers like Cloudflare and Akamai. The increased load can strain networks, leading to slower speeds and reduced reliability. For remote-first companies, this can affect productivity and the ability to access critical services.

STRAIN ON TRANSPORTATION

- The National Climate Assessment reports that the frequency and intensity of extreme weather events have increased over the past 50 years and are expected to continue to rise. These events can damage roads, bridges, rail lines, and ports, causing significant disruptions to transportation networks. For remote-first companies, this can disrupt travel plans for employees who need to travel for work, impacting productivity and business opportunities.

FINANCIAL IMPACTS FROM CLIMATE EVENTS

- According to the National Oceanic and Atmospheric Administration (NOAA), the U.S. experienced 18 weather/climate disaster events in 2022 with losses exceeding \$1 billion each. Such events can lead to increased operational costs for businesses, including higher insurance premiums. Remote-first companies may face rising insurance premiums for their operations, data centers, and other physical assets. Additionally, businesses need to invest more in resilient infrastructure and backup systems to mitigate the risk of climate-related disruptions, leading to increased capital expenditure.
- According to a study published in the Journal of Environmental Economics and Management, productivity decreases by about 2% for every degree Celsius increase above room temperature. During extreme weather events, employees working remotely may experience power outages, internet disruptions, or be forced to evacuate, further impacting productivity. Decreased productivity not only affects the bottom line but can also lead to missed deadlines, reduced customer satisfaction, and strained relationships with clients and partners.

HAZARDS AND VULNERABILITY ASSESSMENT


TRANSITIONAL AND OTHER RISKS:

Climate change acts as a “threat multiplier,” exacerbating resource scarcity, migration, and competition, which can lead to increased instability and conflict. This environment impacts remote-first companies in several key areas:

- Climate change-induced droughts, floods, and extreme weather can disrupt agricultural and manufacturing supply chains critical to businesses worldwide. Remote-first companies, despite their digital nature, rely on physical goods (e.g., computer hardware) and services (e.g., cloud infrastructure) that might be affected by these disruptions. For instance, conflict in key regions can lead to restricted access to rare earth minerals essential for electronics, affecting supply chain costs and timelines.
- In the face of rising geopolitical tensions, countries are increasingly enacting data sovereignty laws requiring data about citizens or residents to be collected, processed, and stored within the country’s borders. The Global Data Protection Regulation (GDPR) in the EU and the Cybersecurity Law in China are examples. These regulations can complicate operations for remote-first companies, requiring them to navigate a complex patchwork of laws and potentially invest in local data centers, affecting operational flexibility and increasing costs.
- The aftermath of climate events can spike the cost of resources. For example, Hurricane Harvey in 2017 caused a sharp increase in the price of raw materials due to its impact on supply chains. Remote-first companies, while not bound by location, may still face increased costs for hardware, cloud services, and other essentials whose prices can rise due to disrupted supply chains or increased energy prices.

IMPACT OF TECHNOLOGICAL INNOVATION ON CLIMATE RESILIENCE

- Remote-first companies leveraging green technologies can significantly reduce their carbon footprint and operational costs (e.g., energy-efficient data centers, cloud computing, and renewable energy sources).
- AI and big data can provide remote-first companies with advanced analytics for predicting climate-related disruptions, optimizing resource use, and improving decision-making.
- As remote-first companies increasingly rely on digital technologies for resilience, they also become more vulnerable to cyber threats. Maintaining robust cybersecurity measures is essential but requires significant resources and constant vigilance.
- New technologies can go from innovation to widespread adoption within a few years. For example, cloud computing adoption has grown from 24% to 92% in enterprises between 2015 and 2020, according to the RightScale 2020 State of the Cloud Report.
- Keeping pace with rapid technological changes requires remote-first companies to be agile and continuously invest in updating systems and training employees, posing challenges in terms of costs and operational focus.



CAPABILITY ASSESSMENT

M CAPABILITY ASSESSMENT

Mazzetti does not have a large number of material assets compared to many other organizations of similar size and reach. This makes a capability assessment somewhat different than a similar assessment for a government jurisdiction or a campus.

MATERIAL: Our company's relative lack of material assets can itself be an asset in that it reduces the potential exposure to damage from an event. For example, in an office-based organization, a storm doing severe damage to an office could seriously impact both operations and financial stability for an organization. Multiple employees could be knocked offline at once, causing potentially greater damage and increasing the time and difficulty of recovery.

Mazzetti's light material footprint reduces the damage to the organization from large discrete events. While individual employees may be severely impacted, others located in other areas would not be, and in an effectively distributed environment, this could greatly enhance the ability of teams to redistribute work among unaffected employees more easily, thereby enabling us to continue operating much more easily.

NON-MATERIAL: We have embraced a remote-first culture. This allows our company to leverage its advantages and mitigate its disadvantages more effectively than if we were more hesitant about promoting a remote culture.





RESILIENCE STRATEGIES

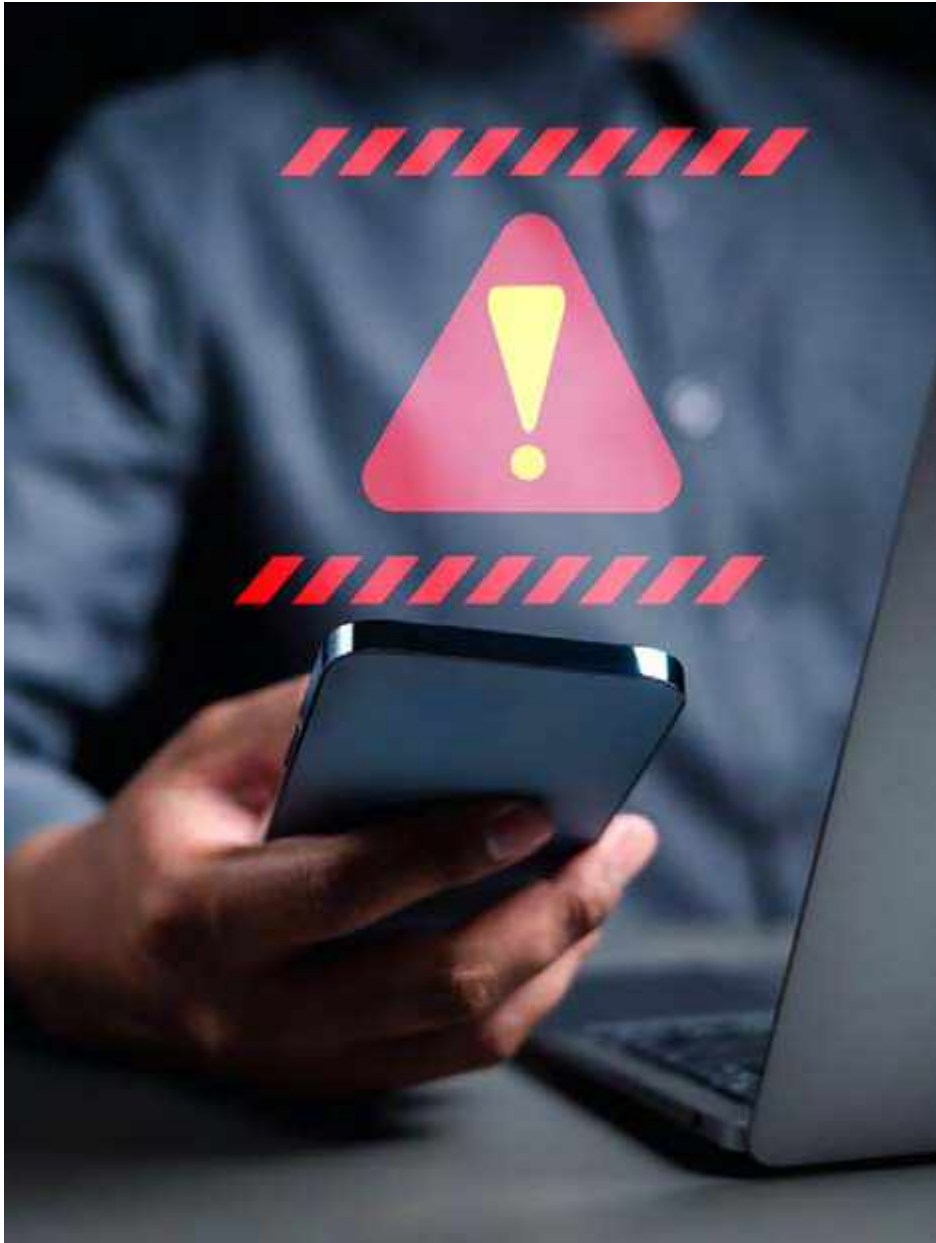
M RESILIENCE STRATEGIES

DIGITAL INFRASTRUCTURE RESILIENCE

- Invest in enterprise-grade cloud computing platforms to house digital infrastructure using provider data centers with industry-leading uptime statistics and failover capabilities. Evaluate Internet as a Service/Software as a Service (IaaS/SaaS) vendors based on their disaster recovery provisions for rapid regional failover, backup power supplies, and minimum Tier III-equivalent data center resilience to threats like floods, winds, fire, and seismic hazards.
- Prioritize natively efficient cloud software through evaluating on-demand resource scaling, automated power management via containerized microservices, and optimized code profiling to prevent resource bloat. This increases resilience to energy spikes, grid outages or supply chain disruptions to IT hardware components.
- To enhance resilience against localized climate events, work with cloud providers with data centers across multiple geographic regions. Implement a real-time data replication strategy to a secondary location, ensuring minimal downtime. Utilizing disaster recovery as a service (DRaaS) can provide a managed, streamlined experience with guaranteed recovery times. Tailor backup frequency and define recovery point objectives (RPOs) based on the criticality of data, with more frequent backups for essential operations. Recovery time objectives (RTOs) should also be established, with priority systems receiving the fastest recovery solutions. For non-essential data, near-real-time replication could be a cost-effective alternative, providing a balanced approach between immediacy and resource expenditure.
- Communications:
 - For extreme scenarios where traditional internet services are disrupted, satellite communication can be a reliable fallback. Investing in satellite phones or setting up contracts with satellite service providers could ensure connectivity during terrestrial network outages.
 - Encourage employees to have access to multiple internet providers, including wireless cellular data as a backup to their primary wired connection. This redundancy can be crucial during local outages.
 - Establish and disseminate clear protocols for emergency communications. This should include a hierarchy of preferred platforms, guidance on how to switch between them, and a pre-defined check-in schedule in case of widespread disruptions.
 - In cases where cloud-based communication services might be impacted by regional climate events, having a Mazzetti-owned physical communications server that employees can connect to remotely can provide an additional layer of redundancy.



M RESILIENCE STRATEGIES



BUSINESS CONTINUITY AND EMERGENCY PLANNING

- Develop a comprehensive business continuity plan that includes procedures for maintaining operations during various climate-related disruptions.
 - Conduct a detailed business impact analysis to understand which areas of our business are most vulnerable to disruption. Clearly identify critical business functions and processes, along with the resources required to maintain them. Determine the minimum level of service that can be sustained during an interruption and plan for the gradual restoration to full service.
 - Designate an emergency response coordinator and a supporting team with clearly defined roles and responsibilities. This team should be trained to lead and execute the business continuity plan in the event of a climate-related event.
 - Outline detailed communication strategies to keep stakeholders informed during an event. This includes employees, customers, suppliers, and potentially, the media.
 - Ensure robust data protection with an IT disaster recovery plan that aligns with the business continuity plan, detailing the steps for restoring IT systems and data access.
 - Conduct regular business continuity training for all employees, along with drills and simulations to test the effectiveness of the plan in real-world scenarios.
 - Establish a regular review cycle for the plan, updating it to reflect changes in the business environment, emerging risks, and lessons learned from drills or actual events.

M RESILIENCE STRATEGIES

PHYSICAL ASSETS

- When choosing future leased offices or co-working spaces, conduct a detailed analysis of geographic risks specific to the city and neighborhood. Opt for locations less prone to extreme weather events and/or regions with robust infrastructure capable of withstanding climate impacts. Use commercially-available climate risk platforms such as First Street Risk Factor to obtain specific profiles of climate risks for specific addresses. Walk around the potential location to understand neighborhood context and potential risk.
- Regularly audit the resilience of physical locations against climate hazards. Inspect and assess buildings and offices for vulnerabilities and ensure that they meet or exceed local codes and standards for weather resistance. Keep a record of any findings over time.
- Implement a schedule for regular, preventative maintenance and upgrades to fortify leased spaces against extreme weather. This includes reinforcing windows, roofs, and walls, caulking and otherwise waterproofing physical spaces as well as ensuring that associated drainage systems are capable of handling heavy rainfall events.
- Equip all physical sites with emergency supplies and response plans for employees who may happen to be there. This should include a 24-hour supply of food and water, first-aid supplies, light sources and a radio. Make sure that these plans are easily accessible and that all employees who use the space are familiar with them.
- Secure comprehensive insurance coverage for all physical assets, specifically policies that include protection against the type of climate and weather-related risks identified in the location analysis. Be mindful of how insurers and policies are responding to local extreme weather events; for example, inquire with potential providers about plans to continue coverage in the state (this has become an issue in several states already, including California where Mazzetti currently has three offices). Regularly review and update coverage to align with current valuations and risk profiles.
- If possible, install backup power solutions such as generators or battery systems to ensure continuity of operations during power outages. Consider renewable energy options, like solar panels with battery storage, which can also contribute to sustainability goals.

- For any new physical spaces in the future, invest in climate-adaptive design features that proactively manage climate risks. These might include elevated structures in flood-prone areas, fire-resistant materials in wildfire zones, and energy-efficient heating and cooling systems to manage extreme temperatures.
- Negotiate terms within lease agreements that address the responsibilities for climate resilience upgrades and maintenance. Ensure clauses allow for modifications needed to adapt and respond to evolving climate risk assessments.

SUPPLY CHAIN RESILIENCE

- To the greatest extent possible, have backup parts and components available owned by Mazzetti itself in locations nearest to the greatest concentrations of Mazzetti employees and IT support. Try not to depend on ordering from manufacturers or suppliers who may not be able to deliver in a timely manner during an extreme event.

INSURANCE

- Property and Casualty Insurance: Assess the potential for climate-related damage to these assets and ensure coverage is adequate. Insurance premiums are likely to be higher in high-risk areas, and special riders or policies may be needed.
- Cyber Insurance: There could be an increased risk of cyber-attacks during climate events, as systems become more vulnerable. The future remote-only focus of Mazzetti will also increase the impact of a successful major cyberattack. Cyber insurance should cover the costs associated with these risks, including data breaches and recovery processes.
- Workers' Compensation and Health Insurance: Even remote employees may face work-related injuries or health issues exacerbated by climate events. The stress from climate events can impact mental health. Insurance that covers mental health services can be a valuable part of a company's health benefits.
- Director's and Officer's (D&O) Insurance: This protects against the fallout from decisions made by company leaders. As climate risk becomes a more prominent concern, the decisions around how companies address or fails to address climate risks could result in claims against directors and officers.
- Parametric Insurance: Unlike traditional insurance that pays out after loss assessment, parametric insurance pays when certain parameters are met, like a specific wind speed or earthquake magnitude.

M RESILIENCE STRATEGIES

- Insurance Cost Considerations: Climate change is leading to an increase in the frequency and severity of natural disasters, which is already resulting in higher insurance premiums. Mazzetti will need to budget for these increases. Deductibles and coverage limits should be regularly evaluated to ensure they are aligned with the potential increased costs associated with climate risks. It will be beneficial to work with insurance advisors who specialize in climate risk to ensure we have the best possible coverage as the market and the climate continue to change.

FINANCIAL PLANNING

- Proactively allocate financial resources to buffer against the unpredictable costs that climate-related disruptions can incur. This might mean setting aside a dedicated emergency fund or line of credit that can be accessed quickly when needed. It's also wise to forecast and plan for the potential financial impact of new environmental regulations, which could include taxes on carbon emissions, required investments in sustainable technology, or penalties for non-compliance.
- Consider any future corporate investments to be evaluated against climate risk-related criteria, ensuring any entities invested are less likely to be negatively impacted by climate-related events and socioeconomic shifts. Look into moving our corporate accounts into institutions that are thoroughly considering climate-related physical and transition risks into future planning and money management.

HOME OFFICE RESILIENCE

- Mazzetti can encourage and subsidize the installation of backup power solutions, such as uninterruptible power supplies (UPS) or portable generators.
- Support could extend to IT infrastructure, with provisions for surge protectors to safeguard electronic devices, or offering cloud storage solutions to ensure data integrity regardless of local climate conditions.
- Provide recommendations or company-sponsored access to broader home climate resilience resources, including advisors specializing in resilience actions such as floodproofing.

- Develop and conduct regular training sessions on personal and professional climate resilience, including how to adapt home offices for changing climates and best practices for maintaining productivity during extreme weather conditions.
- Encourage employees to engage with local community efforts focused on climate resilience.

EMPLOYEE HEALTH AND WELL-BEING

- Acknowledge the psychological impact of climate change, which can range from stress due to extreme weather events to anxiety about future uncertainties. Offer programs such as counseling services, mental health days, and stress management workshops to help employees cope with these challenges.
- Create specific guidelines that help remote workers set up their home office in a way that minimizes health risks, including ergonomic assessments, recommendations for regular breaks, and exercises to reduce the risk of sedentary lifestyle issues.
- Offer resilience training programs that help employees develop the skills to adapt to and recover from climate-related stresses. This training can include personal resilience techniques, emergency preparedness, and resilience strategies for dealing with extreme weather events.
- Review and adjust health insurance policies to ensure they cover treatments for conditions exacerbated by climate change. Ensure that the policies are flexible enough to cover new health challenges that may arise as the climate continues to change.

A photograph of a wind farm with several turbines silhouetted against a blue sky and distant mountain ranges. The turbines are positioned on a dark, forested ridge. The background shows layers of blue mountains under a clear sky.

IMPLEMENTATION PLAN

M IMPLEMENTATION PLAN

Our first priority should be to develop a comprehensive business continuity and resilience plan, focused on all threats to the business. This plan should create a detailed section on IT infrastructure resilience, focusing on redundant systems, data backup protocols, and cloud computing resources. It should also include specific risk assessments for cyber threats, data breaches, and service outages, with clearly outlined response strategies for each. Mazzetti should form an internal team dedicated to the plan's implementation, led by a C-suite executive to ensure the plan has visibility and authority within the organization. This team should have clear roles and responsibilities, with the authority to make critical decisions in a crisis.

Mazzetti should simultaneously prioritize our overall IT infrastructure. Compared to sustainability and clean energy, there is virtually nothing published about climate resilience and the Internet. There are some data center operators who are thinking about these topics, and Mazzetti should reach out to them, but there is little about the Internet as a whole.

In the absence of existing comprehensive research on Internet climate resilience, Mazzetti can sponsor targeted studies that investigate the vulnerabilities of the internet infrastructure to climate-related disruptions. This can involve partnerships with academic institutions or research think tanks specializing in technology and sustainability. For a company aspiring to be a remote-first company, there is no greater problem to be mitigated against than threats to the connectivity that the company depends on for its existence.

Beyond this, we should prioritize the following areas:

- **INSURANCE AND FINANCE:** Insurance is becoming a grave issue in many parts of the United States as insurers boost rates and drop coverage as climate-amplified disasters multiply. Mazzetti should also give careful thought to how we invest our money, making sure that any entities we deal with have considered climate risk themselves as evidenced through TCFD reporting or its successor protocol, at least partially mitigating potential adverse impacts to Mazzetti's investments.
- **PHYSICAL OFFICES (CORPORATE):** Even though Mazzetti intends to not own office space in the near future, it is still important to understand and mitigate against risks in facilities currently being used. Mazzetti should implement standard disaster preparedness measures in each office, including ample supplies of emergency kits, weatherproofing office facilities, and installing generators. Incorporate advanced warning systems and evacuation plans that can be activated swiftly in the event of an impending disaster.

- **PHYSICAL OFFICES (HOME):** As Mazzetti transitions to a remote-first organization, employees' home offices will become potential vulnerabilities. Mazzetti should develop a program that offers grants or stipends to employees for home office upgrades, such as surge protectors, backup power solutions, and ergonomic furniture that can withstand extreme conditions. Mazzetti should also provide comprehensive guidance on creating resilient home offices, including training sessions on emergency preparedness, ergonomics in home setups, and cybersecurity best practices.

MONITORING, REVIEW, AND CONTINUOUS IMPROVEMENT

- Regularly review and update the risk management strategy to reflect new information, changing climate scenarios, and regulatory changes.
- Create channels for employees to provide feedback and suggestions on improving the organization's resilience and sustainability efforts.
- Establish key performance indicators (KPIs) to measure the effectiveness of the strategy and make data-driven adjustments.



An aerial photograph of a dense green forest. In the center, there is a large, spiral-shaped clearing. The clearing is composed of a light-colored, sandy or dirt path that winds in a clockwise spiral pattern. The path is bordered by a thick ring of green trees and shrubs. The surrounding forest is a mix of various shades of green, indicating different types of trees and vegetation. The overall scene is captured from a high angle, looking down on the forest.

CONCLUSION

M CONCLUSION

Climate resilience planning for the private sector is still in its infancy – even more so for organizations aspiring to operate as remote entities with very little physical footprint. While the concept of sustainability has much more easily been embraced, resilience to extreme weather events has, if at all, typically been thought of as an adjunct of business continuity planning. And in important ways, there is a natural fit – to whatever degree the likelihood or severity of a flood was increased due to climate change, it is still a flood.

Climate resilience planning in the public sector generally centers around spatially-bounded areas, from facilities such as schools or hospitals to cities, counties, states, and nations. Determining climate impacts on a building or a city can be difficult but conceptually merely a development of disaster risk reduction, projected with a longer timeframe and greater uncertainty, but the process is not unfamiliar.

At first glance, however, a remote organization is different. With minimal to no physical footprint, it can seem like there is little to assess. Traditional methods are certainly of less utility in an organization that plans to own or lease no physical space in the next decade.

But climate impacts are not simply forces acting upon objects. The “invisible infrastructure” of the modern world goes far beyond offices. It includes protocols, procedures, insurance, finance, and other systems that make an organization live. And these systems are not isolated from one another or the outside world – systems theorists from Donella Meadows to today have described how they, rather than isolated, discrete objects, are at the heart of the world.

A remote organization rests on a vital physical substrate of cables, servers, and other technologies inside the operations of the organization as well as the greater electric and communications networks that tie it to the rest of the world. All of these are undeniably physical and susceptible to climate impacts.

Finally, while it is nearly impossible to evaluate the home offices and working conditions of over 200 individuals, those, too, have a level of physicality that can be considered. As do the employees themselves. Becoming remote-first is by itself a very effective climate adaptation, but it is not an escape.

As climate change accelerates and more and more organizations find the need to plan for their own adaptations common standards and techniques will become refined and socialized across industries. Our company’s climate resilience plan is one of the first to approach the problem from this perspective, but it will not be the last.



**ATLANTA**

1175 Peachtree Street NE
Suite 1000
Atlanta, CA 30361
678.904.1716

DENVER

2590 Welton Street
Suite 200
Denver, CO 80205
720.644.5032

EUGENE

940 Willamette
Suite 310
Eugene, OR 97401
514.686.8478

INDIA

Level 14, Concorde Towers
UB City, No. 24 Vittal Mallaya Road
Bangalore, Karnataka, India, 560001
080.41277869

HUNTINGTON BEACH

7777 Center Avenue
Suite 270
Huntington Beach, CA 92647
310.743.3848

NASHVILLE

393 Nichol Mill Lane
Suite 150
Franklin, TN 37067
615.329.4460

PORTLAND

121 SW Salmon Street
Suite 1000
Portland, OR 97204
503.620.3232

SACRAMENTO

3600 American River Drive
Suite 203
Sacramento, CA 95864
916.979.4890

SAN FRANCISCO

220 Montgomery Street
Suite 640
San Francisco, CA 94104
415.362.3266

SEATTLE

2013 4th Avenue
Suite 200
Seattle, WA 98121
425.672.1071

ST. LOUIS

8112 Maryland Avenue
Suite 400
St. Louis, MO 63105
314.884.7600