

How can asset owners manage climate risk?

Four Twenty Seven, May 2020

In the world where quarterly corporate reporting makes it feel like financial markets are ruled by short-termism, asset owners stand out in contrast, managing their portfolios with horizons in the decades and even longer. With trillions in assets under management and the long-term well-being of their beneficiaries and other stakeholders as their goal, asset owners' risk management practices must be robust. This includes the consideration of factors beyond traditional financial metrics. While their long horizon allows asset owners to withstand short-term volatility, their portfolios may be exposed to higher levels of other risks, including those posed by a changing climate, which is not necessarily accounted for in asset prices.

Additionally, regulatory actions like [the EU Action Plan on Sustainable Finance](#), growing global support

of the [Task Force on Climate-related Financial Disclosures \(TCFD\)](#), and groups like [the Network for Greening the Financial System](#), whose members include 42 central banks and supervisors, are pushing investors of all stripes to take physical climate risks into account, warning of dire systemic consequences if climate risks continue to go unpriced.

With climate risk moving from the fringes of finance to center stage, the challenge is to translate climate models and climate data into actionable intelligence for financial decision-making. [Climate models are complex](#), incorporating information from many disciplines of earth science, and their outputs are unwieldy. However, when transformed into indicators at appropriate scales and timeframes, climate data provides essential forward-looking information for financial decision-makers.

ASSESSING EXPOSURE TO INFORM RISK MANAGEMENT

Evaluating an asset's exposure to physical climate hazards is challenging, yet also an essential first step in managing climate risks. Four Twenty Seven's [Physical Climate Risk Application](#) (Application) allows investors to assess exposure to floods, sea level rise, hurricanes & typhoons, heat stress and water stress at the asset and portfolio levels. Asset owners leverage hazard exposure scores to identify regional and sectoral trends as well as specific hotspots. Flexible viewing options and digestible data provide insight for portfolio risk assessments and due diligence processes. Armed with climate risk data at decision-relevant scales, asset owners can begin to manage their risk.

Climate Data for Portfolio Management

Real estate, infrastructure, agriculture, timber and other real assets have long been an integral compo-

nent of an asset owner's portfolio due to their returns and the diversification they offer to the overall fund. However, many real assets are highly vulnerable to physical climate risks. These risks [manifest in direct and indirect ways](#), including increased costs, reduced revenues, and decreased asset value.

Asset owners use Four Twenty Seven's Application to evaluate forward-looking physical climate risk exposure. For example, the portfolio-specific summary table in Figure 1 provides a snapshot of exposure and serves as the starting point for the analysis of physical climate risks. In this portfolio, hurricanes & typhoons, earthquakes, heat stress and water stress are the most prevalent hazards.

While asset owners frequently emphasize the hazards they view as most financially material—for instance floods, hurricanes, and sea level rise—heat

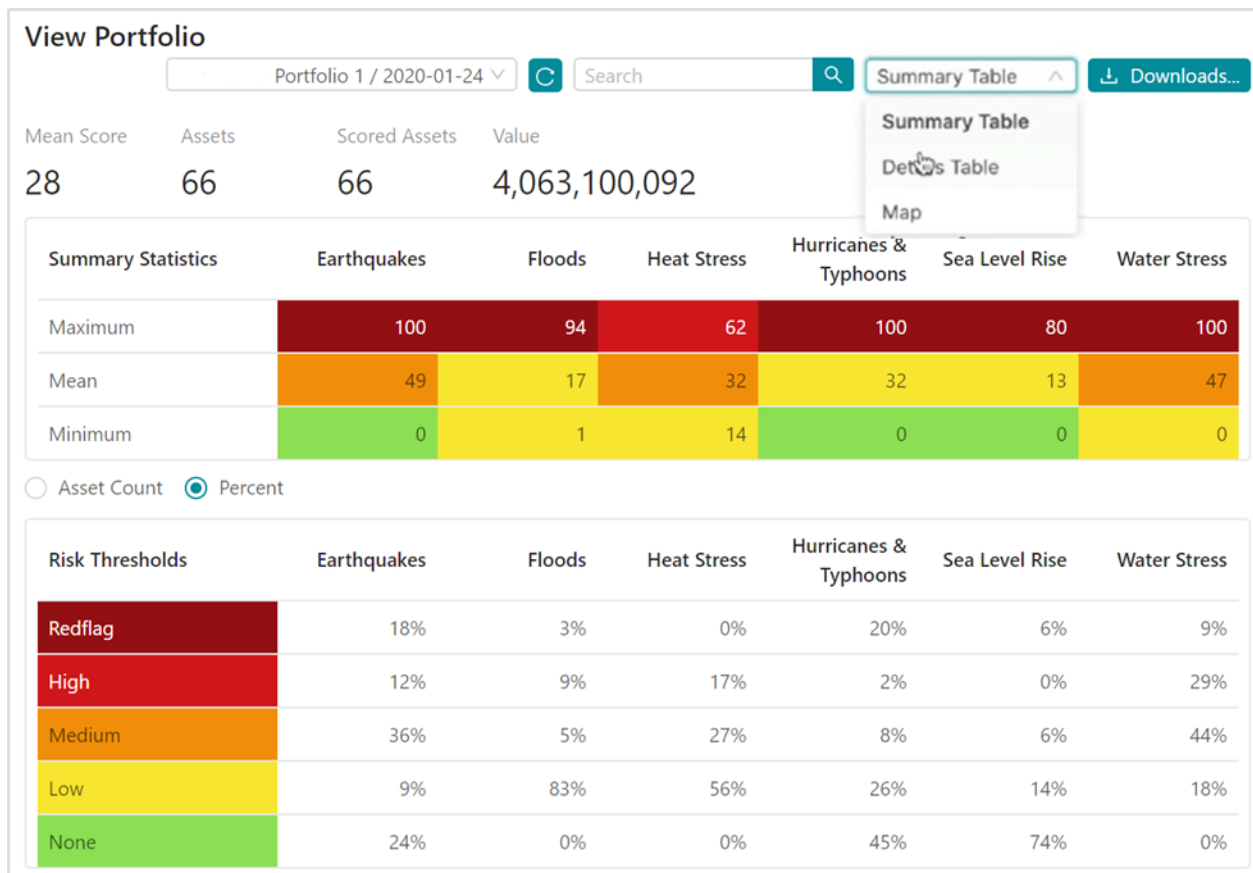


Figure 1. Four Twenty Seven summary table of physical climate risk scores for a real asset portfolio.

stress and water stress can also have material financial impacts. For instance, a major heat wave across Europe in the summer of 2019 demonstrated how increasing temperatures can cause **business disruptions and raise operating costs**. Absent retrofits to address climate risks in European real estate, the total **increase in energy bills** for commercial buildings could potentially cost \$300 billion (£457 billion) by 2050. Water stress, another potentially overlooked risk, can threaten the long-term operations of assets like thermal power plants that rely on large amounts of water for cooling. For example, Moody’s found that 11 major U.S. utilities representing **over \$31 billion in rate** base have extreme risk to water stress, which has already caused some power utilities to **retire capital-intensive generation facilities early**.

In addition to providing an entry point for further analysis, metrics in the summary table are useful for

risk reporting. As reporting requirements develop, outputs from the Physical Climate Risk Application will empower asset owners to effectively describe asset exposure, communicate how risks are being managed, and characterize their portfolios’ overall climate risk and resilience strategies.

Asset owners can also identify exposure hotspots, explore sectoral trends, and dive deeper into the exposure of individual assets. Figure 2 shows the same portfolio ranked by highest flood risk score. Floods can raise costs, cause **business disruption**, and **decrease asset values**.

Using the data in Figure 2, asset owners can consider shortening their holding periods for assets with the highest levels of exposure, ensure that they have appropriate insurance coverage, and evaluate if coverage or premium prices may rise in the future. As

View Portfolio								
Portfolio / 2020-05-14		Search		Details Table		Categories		Downloads...
Mean Score	Assets	Scored Assets	Value					
28	66	66	4,063,100,092					
Id	Name	Earthquakes	Floods	Heat Stress	Hurricanes & Typhoons	Sea Level Rise	Water Stress	Average Score
53367	Japan Manufacturing	80	94	19	100	80	21	63
567918	Singapore Office	30	91	63	26	50	55	57
53640	Japan Shopping Centre	100	65	24	93	40	40	52
35833	Belgium Shopping Centre	59	65	24	0	0	42	26
567907	Mexico Residential	82	63	39	29	0	53	37
35838	Germany Storage	61	57	25	0	0	13	19
35832	Belgium Residential	54	57	21	0	0	47	25
35831	Belgium Office	59	53	29	0	0	43	25
43289	Japan Manufacturing	91	45	14	80	80	29	49
567894	United States Residential	82	44	39	0	0	93	35
567898	United States Residential	85	40	37	0	80	94	50
25688	Japan Residential	80	18	17	45	0	40	24

Figure 2. Four Twenty Seven details table of physical climate risk scores, ranked by highest flood risk

the climate changes, **insurers' risk tolerances may also reach their limits** and they may seek to **exit markets**. It is thus essential for asset owners to monitor the evolving landscape. Beyond evaluating potential changes to insurance, asset owners can also use this data as an entry point for engagement with a building manager, to better understand the site's flood history and investigate if the asset has flood defenses.

Institutional investors understand that, over the typical commercial real estate hold period of seven to ten years, the next buyer of their building is likely to be concerned by climate risk as well. The Application equips asset owners with the exposure data they need to make sure their portfolios are resilient to climate risks and continue to provide the returns they need and expect from the asset class.

Climate Data for Due Diligence

Beyond analyzing portfolios of existing holdings, the application's real-time scoring allows asset owners to quickly incorporate physical climate analysis into

their due diligence processes for new acquisitions. In addition to providing easily digestible, high-level screening results, granular climate data allows clients to continue to invest, for example, in valuable coastal markets with known exposure. Figure 3 shows exposure of nine facilities in Tokyo, where the combination of storm surge and sea level rise could cause **\$1 trillion (100 trillion yen) in damages** in a 1-in-100 year storm. Because the sea level rise (and flood) data featured in the Application is at a scale of 90 x 90 meters, investors do not need to eliminate entire markets from their investment strategies. Rather than exiting a profitable market, asset owners can use the Four Twenty Seven Physical Climate Risk Application to selectively invest in assets with lower exposure.

Asset owners often use Four Twenty Seven data to set their own internal thresholds for further due diligence. Using the detailed site information, as shown in Figure 4, as well as the downloadable scorecard, analysts can quickly understand which hazards to investigate further.

Some investors require further due diligence for any assets that receive “High” or “Red Flag” scores. Deal teams may be tasked to investigate asset-specific features that would make it more resilient to specific

climate hazards, such as freeboard above base flood elevation, onsite power generators, or water efficiency measures.

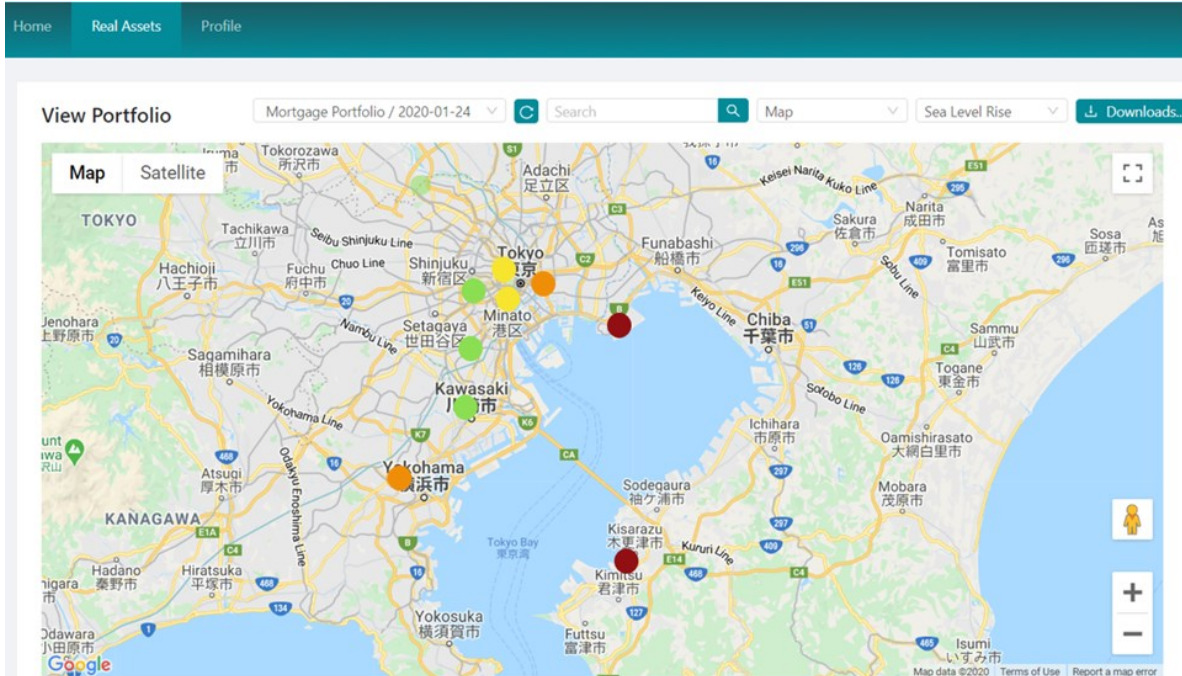


Figure 3. Four Twenty Seven sea level rise scores. Risk thresholds range from green to red, with green points showing assets not exposed and red points showing assets with the highest level of exposure to sea level rise.

Japan Freight logistics Compact Scorecard CSV

Address: JPN Activity: Freight logistics
 Coordinates: (35.62242, 139.90232)

Category	Risk Level	Category Score	Country Benchmark
Earthquakes	Red Flag	80	78
Floods	Low	13	35
Heat Stress	Low	25	23
Hurricanes & Typhoons	Red Flag	100	76
Sea Level Rise	Red Flag	80	20
Water Stress	Medium	42	29

Subcategory	Measure	Unit	Subcategory Score	Country Benchmark
Current Baseline Water Stress	0.90	Ratio (unitless)	56	30
Current Interannual Variability	0.15	Standard deviation	11	23
Future Water Demand	1.02	Cubic km	100	62
Future Water Supply	1.30	Cubic km	30	38
Water Demand Change	85.45	Percent	58	62
Water Supply Change	99.92	Percent	75	82

Figure 4. Four Twenty Seven climate risk assessment.



CONCLUSION

Real assets, whose time horizon of returns aligns well with the investment goals of asset owners, are exposed to physical hazards, which will continue to become more frequent and severe. Exploring asset-level climate hazard exposure is the first step to analyzing and ultimately managing physical climate risk. As regulation around climate risk rapidly evolves,

mandates to monitor and report these risks will also expand. Equipped with a detailed understanding of their portfolio holdings' exposure, asset owners are empowered to make better-informed investment and risk management decisions, ultimately enhancing the resilience of their portfolios to physical climate risk.

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ABOUT FOUR TWENTY SEVEN

Four Twenty Seven (427mt.com), an affiliate of Moody's, is a leading publisher and provider of data, market intelligence and analysis related to physical climate and environmental risks. We tackle physical risk head on with analytics that identify the exposure of any location in the world to climate change hazards such floods, sea level rise, hurricanes & typhoons, heat stress and water stress, which pose an immediate threat to investment and loan portfolios.

Four Twenty Seven provides [on-demand analytics and subscription data products](#) to access this unique offering. Our physical climate risk application allows users to explore the climate risk drivers for a single asset or a portfolio of assets, scoring thousands of locations in minutes. We also offer

forward-looking climate risk scores for equities, based on an ever-growing database that now includes over one million corporate sites and covers over 2,000 publicly-traded companies globally. Additional datasets include climate risk scores for Real Estate Investment Trusts, sovereigns and U.S. municipalities.

Four Twenty Seven has won multiple awards for its innovative work on climate risk and resilience and our work has been featured by Bloomberg, the Financial Times and the New York Times. Four Twenty Seven was founded in 2012 and is headquartered in Berkeley, California with offices in Washington, DC, Paris, France and Tokyo, Japan, and a local representative in London.



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