

Climate Related Financial Risk Report

Pursuant to California SB 261/ HSC S. 38533
Reporting Period: FY 2025

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Introduction

This report has been prepared by Resonetics to satisfy the requirements of the California Climate-Related Financial Risk Act, which requires businesses with over \$500M of revenue doing business in California to publicly report their climate-related financial risks and reduction plans. The format and information presented follow the Task Force on Climate-Related Financial Disclosures (TCFD) IFRS S2 framework. This report describes Resonetics' projected physical and financial risks from climate-related changes and our approach to managing those risks. It also presents the greenhouse gas emissions from our operations in calendar year 2024.

Resonetics LLC is a prominent medical device contract manufacturer with expertise in advanced engineering, prototyping, product development, and micro manufacturing. Founded in Nashua, New Hampshire in 1987, the Company now operates across 19 facilities in the United States, Canada, Costa Rica, Switzerland, and Israel. Resonetics is owned by two Private Equity Companies, Carlyle and GTCR.

Annex 1 provides a summary of Resonetics' manufacturing capabilities and locations.

Governance

Our internal Sustainability program is overseen by the Chief Financial Officer (CFO). The CFO chairs a monthly meeting of the Environmental, Social, and Governance (ESG) Committee, represented by leaders of Operations, Human Resources, Finance, and Procurement. The ESG Committee is primarily tasked with ensuring delivery of ESG-related information to Resonetics' Private Equity owners and customers. This has included submitting information and data to ESG

scoring organizations including EcoVadis, the Climate Disclosure Project (CDP) and IntegrityNext. Management oversight of climate-related risks and opportunities is absent with the exception of sharing progress of the analysis presented in this report through the ESG Committee.

There currently is no Board-level oversight or involvement with Sustainability matters, to include climate-related risks and opportunities.

Strategy

Time Horizons Defined for Risk Management and Planning

Resonetics has established defined time horizons for evaluating climate-related risks and opportunities which align with our broader financial planning capital allocation and strategic decision-making processes. The company classifies its planning horizons as follows:

- Short-term- Less than 1 year
- Medium-term- 1 to 7 years
- Long-term- Greater than 7 years

These timeframes are integrated into Resonetics' enterprise risk management and financial planning systems and are used to evaluate both the potential near-term disruptions and the longer-term strategic implications of climate-related developments. The alignment of these time horizons with the expected lifetimes of asset, capital investment cycles, and strategic initiatives enables a comprehensive and forward-looking assessment of potential climate risks and opportunities.

Physical Risks

Risk Assessment

We have undertaken a location-specific analysis of acute and chronic physical and financial climate risks that are projected to arise over the defined short, medium, and long-term horizons as well as transitional risks.

A proprietary climate risk model created by Jupiter Intelligence was used to assess climate exposure and damage potential across the organization's portfolio of physical sites. The assessment considers projected impacts of hazards such as extreme heat, precipitation, flooding, sea level rise, hurricanes, and other severe weather events and estimates their financial implications in terms of expected annualized losses per \$1 million of asset value. The following physical risks were analysed for each building:

- Flood
- Wildfire
- Wind
- Heat
- Precipitation
- Cold
- Drought
- Hail

The analysis was performed using the following scenario, time horizon and likelihood parameter:

Scenario

There are five Shared Socioeconomic Pathways (SSPs) identified by the United Nations Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report on climate change. SSPs are climate change scenarios of projected socioeconomic global changes up to 2100. They are:

- SSP1: Sustainability ("Taking the Green Road")
- SSP2: "Middle of the Road"
- SSP3: Regional Rivalry ("A Rocky Road")
- SSP4: Inequality ("A Road Divided")
- SSP5: Fossil-fueled Development ("Taking the Highway")

Our analysis is based on SSP2, Middle of the Road (Medium challenges to mitigation and adaptation). This scenario assumes a path forward in which social, economic, and technological trends do not shift markedly from historical patterns. Development and income growth proceeds unevenly with some countries making relatively good progress while others fall short of expectations. Global and national institutions work toward but make slow progress in achieving sustainable development goals. Environmental systems experience degradation although there are some improvements and overall, the intensity of resource and energy use declines. Global population growth is moderate and levels off in the second half of the century. Income inequality persists or improves only slowly and challenges to reducing vulnerability to societal and environmental changes remain. Data is also provided for the SSP5-8.5 (4.4°C) scenario.

Time Horizon

The base year is set at 2020 as this is the date fixed by Jupiter Intelligence for their data fields based on available records, such as flood hazard zones. The model forecasted physical conditions in years 2030 (10-year Change time horizon) and 2050 (30-year Change time horizon).

Likelihood

The probability of various modelled peril events is described in Appendix A of the assessment reports provided in Annex 2. In general, a 1% (100-year event) likelihood event was used. This means there is a 1% chance in any given year that an event of that magnitude or greater will occur. This concept is frequently used as a standard for determining the need for flood insurance as well as risks across other hazard categories. The 1% event is a common benchmark

for assessing physical risks and can be used alongside other longer-term methodologies to capture more detailed potential impacts related to both acute and chronic physical risks.

Risk Assessment Results

Future impacts to Resonetics’ facilities were quantified in the model. Both physical and financial impacts from future climate-related physical events are described in each site assessment report found in Annex 2.

Financial Risks and Opportunities

Financial Consequences

The resulting projected physical risks were assessed for financial consequences considering the valuation of buildings, contents, and inventory.

There will be financial impacts from increased operations cost. For example, in Bethel, CT, the number of annual days above 95°F (35°C) are expected to increase from the current 11 days to 21 days by 2050, an 84% increase. This will result in significant increased air conditioning costs to the site. Increases in flooding, wildfires, and wind will cause physical damage to our sites, resulting in increased capital costs for repairs.

The model forecast a significant decrease in the value of Resonetics’ assets. Table 1 below summarizes projected asset values of each site and the projected decrease in value due to climate related impacts of flood, wind, heat, and wildfire.

Table 1 - Climate Risk Value Adjustment
Reduced value of assets at sites due to climate-related impacts, 2020 to 2050

#	Site	Reduction in Value due to climate impacts (USD)
1	Bethel Building 8	31,248
2	Bethel Building 15	22,287
3	Bethel Building 6	116,917
4	Bethel Building 111	5,646
5	Bethel Building 3	2,336,792
6	Westborough	2,224
7	Costa Rica Building 1	1,223,810
8	Costa Rica Building 2	65,719
9	Vancouver	18,916
10	Montreal	12,413
11	Menlo Park	42,144
11	Hudson Building 1	114,345
13	Hudson Building 2	23,179

14	Quebec	6,121,901
15	San Diego	56,598
16	Hutchinson	133,169
17	Blaine	291,957
18	Nashua	258,129
19	Davis 602	32,392
20	Davis 604	24,845
21	Kettering	4,024
22	Dayton	1,129
23	Switzerland	11,632,302
24	Israel Building 1	-16,007
25	Israel Building 2	-15,081
26	New Hartford	40,968
27	New Boston	39,059
28	New Freedom Bldg #1	62,456
29	New Freedom Bldg #2	39,321
	Total	22,722,802

From climate related impacts, the portfolio asset value will decline by \$23M over the 30-year timeframe.

There will also be significant increases in insurance premiums for our assets. Table 2 below presents the estimated current (2020) and 2050-year cost of insurance for each site.

Table 2 - Technical Cost of Insurance for Assets
Change in cost to procure insurance, 2020 - 2050.

#	Site	2020 Technical Cost of Insurance (USD)	2050 Technical Cost of Insurance (USD)
1	Bethel Building 8	2,264	5,671
2	Bethel Building 15	1,188	3,209
3	Bethel Building 6	9,188	22,919
4	Bethel Building 111	7	18
5	Bethel Building 3	143,377	400,575
6	Westborough	1,727	3,951
7	Costa Rica Building 1	39,643	246,094
8	Costa Rica Building 2	98,718	491,830
9	Vancouver	292	2,069
10	Montreal	116	1,171
11	Menlo Park	4,420	9,434
11	Hudson Building 1	11,550	25,733
13	Hudson Building 2	2,194	4,881

14	Quebec	123,904	749,440
15	San Diego	5,292	12,054
16	Hutchinson	14,127	30,900
17	Blaine	29,701	66,429
18	Nashua	25,596	58,240
19	Davis 602	3,201	6,816
20	Davis 604	2,087	4,868
21	Kettering	250	529
22	Dayton	0	0
23	Switzerland	239,659	1,476,338
24	Israel Building 1	6,579	2,431
25	Israel Building 2	6,251	2,302
26	New Hartford	30,343	35,375
27	New Boston	3,976	8,600
28	New Freedom Bldg #1	6,826	14,536
29	New Freedom Bldg #2	4,205	8,956
	Total cost of insurance	816,681	3,695,369

From climate related impacts, the cost to obtain insurance for assets will increase by \$2.8M annually over the 30-year timeframe.

The resilience of the company's strategy if any taking into consideration the future impacts of climate change under various climate scenarios.

Our current strategy to mitigate climate-related risks to company infrastructure through insurance will be tested as insurance premiums are forecasted to rise significantly.

Opportunities

It is probable that climate change-related impacts from increased perils such as flooding, wildfires, drought and extreme heat and cold will impact human health. These additional human health impacts will likely cause an increased need for medical treatments and the medical device components Resonetics manufactures, although no specific opportunities have been identified.

Transition Risks and Opportunities

Transition risks are those associated with transitioning to a lower-carbon economy. Risks may be realized from changes in the following:

- Policy and legal requirements - increased compliance costs and increased insurance premiums

- Technology – costs to transition to lower emissions technology to satisfy increasingly stringent air permit requirements.
- Markets - increased production costs due to changing input prices (e.g., energy, water, carbon-based fuel, raw materials) and output requirements (e.g., waste treatment)
- Reputation – reduced revenue from shifts in supplier preferences by customers, reduced employee attraction and retention, and reduced capital availability

The transition to a lower-carbon economy presents a complex array of risks and potential opportunities that will evolve over time and differ depending on the trajectory of global climate action. Our analysis considers both a 1.5°C scenario characterized by rapid and ambitious emissions reductions and a 2.5°C scenario reflecting a more gradual and less coordinated transition.

In the short term, defined as the next twelve months, transition risks are materializing. Under a 1.5°C scenario we would expect heightened regulatory action as governments and regulators accelerate the introduction of new climate-related policies, including mandatory disclosures emissions caps and green procurement requirements. Resonetics would face increased scrutiny from stakeholders including customers, employees, and civil society, regarding our climate commitments and disclosures. Under the less aggressive 2.5°C scenario we would expect incremental tightening of regulations with the same effects but stretched out to a longer timeframe. Under both scenarios we face the risk of rising energy costs and potential expenses associated with carbon-reduction mandates.

Over the medium term, spanning the next one to seven years transition risks become more pronounced especially in the 1.5°C scenario. We would expect increasingly robust climate policies to be implemented globally, which would change the regulatory landscape for Resonetics and our investors, customers, and suppliers. The pace of technological innovation would also likely accelerate under this scenario, requiring us to adapt our own operations and invest in the tools and personnel necessary to support internal compliance and customer needs. At the same time, our ability to attract and retain top talent may be impacted by our demonstrated commitment or noncommitment to climate leadership and operational decarbonization. In a 2.5°C scenario, these changes will occur more gradually with regulatory and market pressures building over time but allowing for a more incremental adaptation of our business model and customer relationships.

Over the long term, defined as beyond seven years, the divergence between the two scenarios becomes more pronounced. In a world aligned with a 1.5°C pathway, we foresee a mature harmonized global regulatory environment in which non-compliance carries more significant legal and reputational risk.

There are no foreseeable business opportunities for the company from the transition to a low-carbon economy.

Risk Management

Processes for identifying and assessing climate-related risks

Resonetics will identify and assess climate-related risks periodically to comply with the subject regulation.

Processes for managing risks

Resonetics will manage risks as impacts are realized through conventional processes of asset insurance. Resonetics maintains a robust insurance program for our facilities with tailored coverage for property, business interruption, and infrastructure loss from physical events. As discussed previously, with physical risks intensify with climate change, insurance premiums are forecasted in the model to increase significantly.

Processes for identifying, assessing, and managing climate-related risks are integrated into overall risk management

There currently are no provisions for integrating climate-related risks into the company's risk management strategy.

Company Philosophy with Regard to Climate Risk Management

Resonetics has not prioritized nor implemented efforts to address risks related to climate change or to reduce greenhouse gas emissions. One project, to evaluate potential energy efficiency improvements at our facility in Hutchinson, MN, has been initiated. Many of our buildings are leased, which restricts our ability to undertake certain projects that might require the approval and coordination of the property management and potentially other tenants in the overall building space.

Renewable Energy Strategy Across Facilities

There currently is no program to examine the potential to purchase or generate renewable energy.

Metrics & Targets

Resonetics first estimated our Scope 1 and Scope 2 greenhouse gas emissions for calendar year 2021. More recently we have onboarded the carbon accounting tool Novata to quantify Scope 1 and Scope 2 emissions and begin evaluating Scope 3 emissions. This effort is ongoing with annual data collection and analysis. Our 2024 emissions are presented below:

Scope 1:	2,989 tCO ₂ e
Scope 2 (Location Based):	10,847 tCO ₂ e
Scope 2 (Market Based):	6,228 tCO ₂ e
Scope 3:	9,940 tCO ₂ e
Scope 3 emissions calculated for 2024 are-	
Category 3.1 – Purchased Goods and Services:	5,807 tCO ₂ e
Category 3.3 - Fuel and Energy-Related Activities:	4,133 tCO ₂ e

Resonetics has not established emissions reduction targets.

Disclosure Notes

This report has been prepared in accordance with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) to comply with California’s SB 261. It is intended to provide information regarding potential climate-related financial risks that the company may face. The scenarios, risks, and statements described herein are based on current knowledge, assumptions, and available data as of the date of publication. It reflects our good faith effort to report our climate-related financial risks in accordance with the TCFD recommendations. We have not responded in full to all specified items in the TCFD recommendation, including those where we do not believe the disclosure is material and/or does not provide for a meaningful substantive understanding of the company’s management of climate-related financial risks.

Nothing in this document is intended to imply nor should be construed as implying that any specific risk scenario or statement discussed is financially material to the company. The identification or discussion of any particular risk does not constitute an admission or representation regarding its materiality, probability, or potential impact under applicable securities laws or accounting standards. Readers are cautioned not to place undue reliance on forward-looking statements or scenario analyses which are subject to inherent uncertainties.

Annex 1

Resonetics Capabilities and Locations

Raw Materials

Resonetics produces different types of raw materials for medtech applications, including precision thin wall hypotubing, precious metal marker bands, and nitinol wire. We produce all our raw materials to have high material quality, precise tolerances, and excellent surface finishes.

Nitinol Material

Resonetics melts our own nitinol raw material which is used to make nitinol tube, wire, and sheet for medical devices. We also offer different grades of nitinol material, from standard to ultra-low inclusion premium alloys. We are one of the world's largest producers of nitinol raw material, tubing, and wire for medical devices. The forms of nitinol we manufacture are:

Nitinol Tube

We are a high-volume manufacturer of precision nitinol tubing, with outer diameters as small as 0.15mm and inner diameter as small as 0.010mm.

Nitinol Wire and Strip

We produce nitinol wire and strip that have remarkable durability, flexibility, and kink resistance. Our wire comes in an outer diameter range from 0.076mm to 2.16mm.

Nitinol Sheet

We are one of the main producers of nitinol sheet material, available in both super elastic and thermally flattened shape memory alloy. The thickness range of the sheet is from 0.05mm to 6.35mm.

Material Grades

We produce three different grades of nitinol that can be used in our tubing, wire, and sheet:

- Standard: maximum inclusion size of 30 um and inclusion area fraction of 2.0%.
- Redox: maximum inclusion size of 20 um and inclusion area fraction of 1.2%.
- Enduro: maximum inclusion size of 12 um and inclusion area fraction of 0.5%.

Nitinol Processing

Nitinol, a nickel-titanium (NiTi) alloy, has unique superelastic and shape-memory capabilities essential to medical devices and technologies. We manufacture nitinol medical product by using highspeed femtosecond laser cutting, shape setting, electropolishing, and braiding.

Metal Fabrication

Metal fabrication capabilities include centerless grinding, CNC machining, photochemical machining, stamping, coiling, and microforming.

Laser Processing

A core service is laser processing for complex medical devices, components, and implants. We custom-build our own laser processing systems with capabilities that include:

- » Ablating
- » Cutting
- » Drilling
- » Welding
- » Perforation

Fiber Optic Sensors

We produce fiber optic sensors and readout units for the medical device industry. The sensors are highly precise, extremely small, and impervious to radio frequencies, electromechanical interference, and microwave radiation.

Medical Batteries

Resonetics designs and manufactures a range of electro-chemistries for implantable applications, including lithium-ion, lithium carbon monofluoride (Li/CFx), lithium carbon monofluoride-manganese dioxide hybrid (Li/CFx-MnO₂), and lithium thionyl chloride (Li/SOCl₂).

Electromechanical Sensors

Resonetics designs and manufactures custom electromechanical sensors to collect critical procedure data, like strain and temperature, in medtech applications. These sensors are inserted into devices and implants used in minimally invasive surgery.

Coatings and Coverings

Our advanced polymer coatings and coverings capabilities offer improved performance because of our proprietary adhesion technology. This technology activates the surface and improves the bond between metals and polymers. Based on the application, we can then apply a polymer coating to the metal surface or bond a covering made from fabric or polymer.

Locations

RESONETICS NASHUA

26 Whipple St.
Nashua, NH 03060

RESONETICS KETTERING

2941 College Dr.
Kettering, OH 45420

RESONETICS BLAINE

3761 95th Avenue NE
Suite 100
Circle Pines, MN 55014

RESONETICS DAVIS

602 and 604 Cantrill Dr.
Davis, CA 95618

RESONETICS SAN DIEGO

10540 Heater Court
San Diego, CA 92121

RESONETICS HUTCHINSON

40 Highland Park Dr NE Ste 200
Hutchinson, MN 55350-9783

RESONETICS NEW FREEDOM

302 Pleasant Ave.
New Freedom, PA 17349

RESONETICS COSTA RICA

Zona Franca Coyol
El Coyol de Alajuela
Building B25

RESONETICS SWITZERLAND

Route de Chardonne 4
1070 Puidoux – Suisse

RESONETICS ISRAEL

9 HaHadas St.
Or Akiva Israel, 3065001

RESONETICS WESTBOROUGH

115 Flanders Rd, Suite 202
Westborough, MA 01581

RESONETICS HUDSON

2251 Willis Miller Drive
Hudson, WI 54016

RESONETICS VANCOUVER

13136 82A Avenue
Surrey, B.C.
Canada, V3W 9Y

RESONETICS QUEBEC CITY

500, St-Jean-Baptiste Ave, Ste
195
Quebec, QC
Canada G2E 5R9

RESONETICS MONTREAL

3700 St-Patrick Street, Ste 102
Montreal, QC
Canada H4E 1A2

RESONETICS BETHEL

3 Berkshire Blvd.
Bethel, CT 06801

RESONETICS NEW HARTFORD

4355 Middle Settlement Road
New Hartford, NY 13413

RESONETICS MENLO PARK

4065 Campbell Ave.
Menlo Park, CA 94025

RESONETICS NEW BOSTON

326 Chestnut Hill Road
New Boston, NH 03070

Annex 2

Assessment Reports by **Locations**

Included in this Annex are the climate-related risk assessment reports for each Resonetics location.

The assessments present metrics for each building according to exposures to various perils. The impacts are based on model projections using the carbon emissions scenario SSP2-4.5, the "Middle of the Road" scenario, an intermediate climate change projection where current societal and economic trends continue without significant deviation from historical patterns resulting in an increase in global temperatures by 4.9 degrees F (2.7°C) by year 2100.

The physical risk to each building is determined by the model simulation of climatic conditions and the resulting financial cost is calculated.

The assessment reports that follow cover Resonetics' 29 buildings across 19 sites:

1	Bethel Building 8	15	San Diego
2	Bethel Building 15	16	Hutchinson
3	Bethel Building 6	17	Blaine
4	Bethel Building 111	18	Nashua
5	Bethel Building 3	19	Davis 602
6	Westborough	20	Davis 604
7	Costa Rica Building 1	21	Kettering
8	Costa Rica Building 2	22	Dayton
9	Vancouver	23	Switzerland
10	Montreal	24	Israel Building 1
11	Menlo Park	25	Israel Building 2
12	Hudson	26	New Hartford
13	Hudson	27	New Boston
14	Quebec	28	New Freedom Bldg #1
		29	New Freedom Bldg #2

Bethel Building 8 Location

8 Berkshire Boulevard Bethel CT US

(Coordinates: 41.4198, -73.4015)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Bethel Building 8** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 831 from **wind** events, a loss of USD 15 from a **wildfire** event, and a loss of USD 1,897 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	68
Current Hazard Score (2020)	43
Change Score (2020-2050)	83
Percentile Overall Score Relative to Country:	93
Percentile Overall Score Relative to Admin1 level:	93

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	23	26	52	Moderate
Wind	33	43	79	Elevated
Heat	33	57	28	Low
Cold	73	-54	70	Elevated
Precipitation	45	58	40	Moderate
Wildfire	2	0	2	Lowest
Drought	14	42	47	Moderate
Hail	33	-69	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Bethel Building 8** has a percentile overall score of 93 relative to its admin level 1 for climate hazards and has a percentile overall score of 93 relative to its country. The location is at moderate risk for extreme precipitation, low risk for heat stress, moderate risk for drought, moderate risk for flooding, elevated risk for extreme winds, lowest risk for wildfires, and elevated risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Bethel Building 8**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 9 days per year exceeding 35°C (95°F) and 78 days per year below 0°C (32°F). The **Bethel Building 8** location may also experience roughly 229 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.06 meters of combined flooding. There is an annual wildfire probability of 0.01% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.05 m	0.05 m (0%)	0.06 m (20%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	134 km/hr	136 km/hr (1%)	137 km/hr (2%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (-2%)	12 km/hr (-2%)
Heat	Annual number of days above 35°C	5 days	6 days (23%)	9 days (81%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	11 days	13 days (16%)	21 days (84%)
	Cooling Degree Days	590 degree days	640 degree days (8%)	748 degree days (27%)
Cold	Annual number of days below 0°C	91 days	87 days (-4%)	78 days (-14%)
	Heating Degree Days	2771 degree days	2679 degree days (-3%)	2476 degree days (-11%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	211 mm	217 mm (3%)	229 mm (9%)
	Total water equivalent precipitation (in mm) for the year	1292 mm	1277 mm (-1%)	1319 mm (2%)
Wildfire	Annual probability of wildfires (in %)	0.01%	0.01% (0%)	0.01% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (6%)	0.1 (2%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.12 days	0.11 days (-8%)	0.04 days (-67%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Bethel Building 8**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 831 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 15 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.06%	0.07%	0%	0%
Average Annual Damage (Contents)	0%	0%	0.03%	0.04%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0.03%	0.04%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	667	831	15	15

For **heat**, the annual electricity consumption for cooling is expected to go from 11,616 kWh in 2020 to 14,633 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,897 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,616	14,633
Average Annual Loss (Cooling, USD)	1,506	1,897
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 217 in 2020 to USD 573 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 465 in 2020 to USD 1,227 in 2050 and operative expenditures will go from USD 1,506 to USD 1,897 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 2,169,806 in 2020 and USD 4,622,597 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	217	573
Operational Revenue (OpRev, USD)	465	1,227
Operational Expenditures (OpEx, USD)	1,506	1,897






Technical Cost of Insurance (USD)	2,264	5,671
Non-climate Risk Adjusted Forecasted Value (USD)	2,200,000	4,684,039
Total Climate Risk Value Adjustment (USD)	30,194	61,442
Climate Adjusted Value (USD)⁴	2,169,806	4,622,597

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, WS_windSpeed50yr measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, HT_daysExceeding35C measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 20-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 50-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 100-yr return period (m)	0.05	0.05	0.05	0.06
Depth of flooding at the 200-yr return period (m)	0.08	0.08	0.08	0.09
Depth of flooding at the 500-yr return period (m)	0.13	0.13	0.13	0.14
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	92	92	93	93
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	102	102	102	103
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	114	115	116	116
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	134	136	136	137

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	155	157	158	159
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	185	187	188	189
Average annual wind speed (km/hr)	12	12	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	133	136	139	142
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	155	159	163	167
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	186	191	196	201
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	211	217	223	229
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	238	245	252	258
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	277	285	293	301
Total water equivalent precipitation for the year (mm)	1292	1277	1299	1319

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	5	6	7	9

Days per year with temperature above 38°C	1	1	1	2
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	6	6	7
Number of days per year where WBGT above 32°C	11	13	17	21
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	3	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	12.3	12.7	12.9	13.5
Days per year with temperature below 0°C	91	87	82	78
Days per year with temperature below -10°C	11	10	9	8
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	2.9	1.6	1.2	1.1
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.01	0.01	0.01	0.01

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.19	0.24	0.24	0.15

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.12	0.11	0.05	0.04
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	7	7	7	7

Bethel Building 15 Location

15 Berkshire Boulevard Suite Unit C-2 Bethel CT US

(Coordinates: 41.4226, -73.4037)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Bethel Building 15** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 285 from **flood** events, a loss of USD 236 from **wind** events, a loss of USD 6 from a **wildfire** event, and a loss of USD 1,894 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	81
Current Hazard Score (2020)	62
Change Score (2020-2050)	83
Percentile Overall Score Relative to Country:	97
Percentile Overall Score Relative to Admin1 level:	96

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	43	25	61	Elevated
Wind	33	43	79	Elevated
Heat	34	57	27	Low
Cold	73	-54	70	Elevated
Precipitation	45	58	40	Moderate
Wildfire	3	2	8	Lowest
Drought	14	42	47	Moderate
Hail	33	-69	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Bethel Building 15** has a percentile overall score of 96 relative to its admin level 1 for climate hazards and has a percentile overall score of 97 relative to its country. The location is at moderate risk for extreme precipitation, low risk for heat stress, moderate risk for drought, elevated risk for flooding, elevated risk for extreme winds, lowest risk for wildfires, and elevated risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Bethel Building 15**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 9 days per year exceeding 35°C (95°F) and 79 days per year below 0°C (32°F). The **Bethel Building 15** location may also experience roughly 229 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.33 meters of combined flooding. There is an annual wildfire probability of 0.01% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.28 m	0.29 m (4%)	0.33 m (18%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	134 km/hr	135 km/hr (1%)	137 km/hr (2%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (0%)	12 km/hr (0%)
Heat	Annual number of days above 35°C	5 days	6 days (22%)	9 days (80%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	11 days	13 days (16%)	21 days (84%)
	Cooling Degree Days	589 degree days	639 degree days (8%)	747 degree days (27%)
Cold	Annual number of days below 0°C	91 days	87 days (-4%)	79 days (-13%)
	Heating Degree Days	2773 degree days	2682 degree days (-3%)	2479 degree days (-11%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	211 mm	217 mm (3%)	229 mm (9%)
	Total water equivalent precipitation (in mm) for the year	1292 mm	1277 mm (-1%)	1319 mm (2%)
Wildfire	Annual probability of wildfires (in %)	0.01%	0.01% (0%)	0.01% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (6%)	0.1 (2%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.12 days	0.11 days (-8%)	0.04 days (-67%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Bethel Building 15**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 285 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 236 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 6 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0.08%	0.1%	0.06%	0.07%	0%	0%
Average Annual Damage (Contents)	0.03%	0.04%	0.03%	0.04%	0%	0%
Average Annual Damage (Inventory)	0.04%	0.07%	0.03%	0.04%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	185	285	189	236	6	6

For **heat**, the annual electricity consumption for cooling is expected to go from 11,597 kWh in 2020 to 14,614 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,894 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,597	14,614
Average Annual Loss (Cooling, USD)	1,503	1,894
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 379 in 2020 to USD 1,122 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 1,503 to USD 1,894 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 629,078 in 2020 and USD 1,340,711 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	379	1,122
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	1,503	1,894






Technical Cost of Insurance (USD)	1,188	3,209
Non-climate Risk Adjusted Forecasted Value (USD)	650,000	1,383,921
Total Climate Risk Value Adjustment (USD)	20,922	43,209
Climate Adjusted Value (USD)⁴	629,078	1,340,711

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






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Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
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SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

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Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.15	0.15	0.15	0.15
Depth of flooding at the 20-yr return period (m)	0.15	0.15	0.15	0.15
Depth of flooding at the 50-yr return period (m)	0.17	0.18	0.19	0.21
Depth of flooding at the 100-yr return period (m)	0.28	0.29	0.3	0.33
Depth of flooding at the 200-yr return period (m)	0.42	0.43	0.44	0.48
Depth of flooding at the 500-yr return period (m)	0.63	0.63	0.64	0.67
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	92	93	93	93
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	102	102	103	103
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	114	115	115	116
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	134	135	136	137

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	155	157	158	159
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	185	187	188	189
Average annual wind speed (km/hr)	12	12	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	133	136	139	142
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	155	159	163	167
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	186	191	196	201
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	211	217	223	229
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	238	245	252	259
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	277	285	293	301
Total water equivalent precipitation for the year (mm)	1292	1277	1299	1319

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	5	6	7	9

Days per year with temperature above 38°C	1	1	1	2
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	6	6	7
Number of days per year where WBGT above 32°C	11	13	17	21
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	3	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	12.3	12.7	12.9	13.5
Days per year with temperature below 0°C	91	87	83	79
Days per year with temperature below -10°C	11	10	9	8
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	2.9	1.6	1.3	1.1
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.01	0.01	0.01	0.01

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.19	0.24	0.24	0.15

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.12	0.11	0.05	0.04
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	7	7	7	7

Bethel Building 6 Location

2-4 Research Drive Berkshire Corporate Park Bethel CT US

(Coordinates: 41.4232, -73.403)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Bethel Building 6** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 3,025 from **wind** events, a loss of USD 65 from a **wildfire** event, and a loss of USD 1,894 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	66
Current Hazard Score (2020)	49
Change Score (2020-2050)	74
Percentile Overall Score Relative to Country:	92
Percentile Overall Score Relative to Admin1 level:	93

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	29	14	48	Moderate
Wind	33	43	79	Elevated
Heat	34	57	27	Low
Cold	73	-54	70	Elevated
Precipitation	45	58	40	Moderate
Wildfire	2	0	2	Lowest
Drought	14	42	47	Moderate
Hail	33	-69	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Bethel Building 6** has a percentile overall score of 93 relative to its admin level 1 for climate hazards and has a percentile overall score of 92 relative to its country. The location is at moderate risk for extreme precipitation, low risk for heat stress, moderate risk for drought, moderate risk for flooding, elevated risk for extreme winds, lowest risk for wildfires, and elevated risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Bethel Building 6**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 9 days per year exceeding 35°C (95°F) and 79 days per year below 0°C (32°F). The **Bethel Building 6** location may also experience roughly 229 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.12 meters of combined flooding. There is an annual wildfire probability of 0.01% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.1 m	0.1 m (0%)	0.12 m (20%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	134 km/hr	135 km/hr (1%)	137 km/hr (2%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (0%)	12 km/hr (0%)
Heat	Annual number of days above 35°C	5 days	6 days (22%)	9 days (80%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	11 days	13 days (16%)	21 days (84%)
	Cooling Degree Days	589 degree days	639 degree days (8%)	747 degree days (27%)
Cold	Annual number of days below 0°C	91 days	87 days (-4%)	79 days (-13%)
	Heating Degree Days	2774 degree days	2682 degree days (-3%)	2479 degree days (-11%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	211 mm	217 mm (3%)	229 mm (9%)
	Total water equivalent precipitation (in mm) for the year	1292 mm	1278 mm (-1%)	1319 mm (2%)
Wildfire	Annual probability of wildfires (in %)	0.01%	0.01% (0%)	0.01% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (6%)	0.1 (2%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.12 days	0.11 days (-8%)	0.04 days (-67%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Bethel Building 6**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 3,025 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 65 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0.01%	0.01%	0.06%	0.07%	0%	0%
Average Annual Damage (Contents)	0%	0%	0.03%	0.04%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0.03%	0.04%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	2,415	3,025	65	65

For **heat**, the annual electricity consumption for cooling is expected to go from 11,597 kWh in 2020 to 14,614 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,894 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,597	14,614
Average Annual Loss (Cooling, USD)	1,503	1,894
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 2,042 in 2020 to USD 5,418 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 438 in 2020 to USD 1,161 in 2050 and operative expenditures will go from USD 1,503 to USD 1,894 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 8,411,341 in 2020 and USD 17,891,848 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	2,042	5,418
Operational Revenue (OpRev, USD)	438	1,161
Operational Expenditures (OpEx, USD)	1,503	1,894






Technical Cost of Insurance (USD)	9,188	22,919
Non-climate Risk Adjusted Forecasted Value (USD)	8,500,000	18,097,425
Total Climate Risk Value Adjustment (USD)	88,659	205,576
Climate Adjusted Value (USD)⁴	8,411,341	17,891,848

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

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Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

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Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.05	0.05	0.05	0.05
Depth of flooding at the 20-yr return period (m)	0.05	0.05	0.05	0.05
Depth of flooding at the 50-yr return period (m)	0.06	0.06	0.07	0.07
Depth of flooding at the 100-yr return period (m)	0.1	0.1	0.11	0.12
Depth of flooding at the 200-yr return period (m)	0.15	0.16	0.16	0.18
Depth of flooding at the 500-yr return period (m)	0.24	0.25	0.25	0.26
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	92	93	93	93
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	102	102	103	103
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	114	115	115	116
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	134	135	136	137

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	155	157	157	159
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	185	187	188	189
Average annual wind speed (km/hr)	12	12	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	133	136	139	142
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	155	159	163	167
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	186	191	196	201
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	211	217	223	229
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	238	245	252	258
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	277	285	293	301
Total water equivalent precipitation for the year (mm)	1292	1278	1299	1319

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	5	6	7	9

Days per year with temperature above 38°C	1	1	1	2
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	6	6	7
Number of days per year where WBGT above 32°C	11	13	17	21
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	3	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	12.3	12.7	12.9	13.5
Days per year with temperature below 0°C	91	87	83	79
Days per year with temperature below -10°C	11	10	9	8
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	2.9	1.6	1.3	1.1
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.01	0.01	0.01	0.01

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.19	0.24	0.24	0.15

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.12	0.11	0.05	0.04
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	7	7	7	7

Bethel Building 111 Location

111 Park Ridge Road Berkshire Corporate Park Brookfield CT US

(Coordinates: 41.4259, -73.4008)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Bethel Building 111** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 2 from **wind** events, a loss of USD 0 from a **wildfire** event, and a loss of USD 1,892 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	43
Current Hazard Score (2020)	32
Change Score (2020-2050)	60
Percentile Overall Score Relative to Country:	77
Percentile Overall Score Relative to Admin1 level:	82

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	10	0	8	Lowest
Wind	33	43	79	Elevated
Heat	34	57	27	Low
Cold	73	-54	70	Elevated
Precipitation	45	58	40	Moderate
Wildfire	2	0	2	Lowest
Drought	14	42	47	Moderate
Hail	33	-69	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Bethel Building 111** has a percentile overall score of 82 relative to its admin level 1 for climate hazards and has a percentile overall score of 77 relative to its country. The location is at moderate risk for extreme precipitation, low risk for heat stress, moderate risk for drought, lowest risk for flooding, elevated risk for extreme winds, lowest risk for wildfires, and elevated risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Bethel Building 111**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 9 days per year exceeding 35°C (95°F) and 79 days per year below 0°C (32°F). The **Bethel Building 111** location may also experience roughly 228 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.03 meters of combined flooding. There is an annual wildfire probability of 0.01% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.03 m	0.03 m (0%)	0.03 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	134 km/hr	135 km/hr (1%)	137 km/hr (2%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (0%)	12 km/hr (0%)
Heat	Annual number of days above 35°C	5 days	6 days (22%)	9 days (80%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	11 days	13 days (16%)	21 days (84%)
	Cooling Degree Days	588 degree days	638 degree days (9%)	746 degree days (27%)
Cold	Annual number of days below 0°C	91 days	87 days (-4%)	79 days (-13%)
	Heating Degree Days	2776 degree days	2684 degree days (-3%)	2481 degree days (-11%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	211 mm	216 mm (2%)	228 mm (8%)
	Total water equivalent precipitation (in mm) for the year	1292 mm	1278 mm (-1%)	1320 mm (2%)
Wildfire	Annual probability of wildfires (in %)	0.01%	0.01% (0%)	0.01% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (6%)	0.1 (2%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.12 days	0.11 days (-8%)	0.04 days (-67%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Bethel Building 111**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 2 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 0 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.06%	0.07%	0%	0%
Average Annual Damage (Contents)	0%	0%	0.03%	0.04%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0.03%	0.04%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	1	2	0	0

For **heat**, the annual electricity consumption for cooling is expected to go from 11,578 kWh in 2020 to 14,595 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,892 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,578	14,595
Average Annual Loss (Cooling, USD)	1,501	1,892
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 2 in 2020 to USD 4 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 1,501 to USD 1,892 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 0 in 2020 and USD 0 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	2	4
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	1,501	1,892






Technical Cost of Insurance (USD)	7	18
Non-climate Risk Adjusted Forecasted Value (USD)	5,000	10,646
Total Climate Risk Value Adjustment (USD)	5,000	10,646
Climate Adjusted Value (USD)⁴	0	0

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, WS_windSpeed50yr measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, HT_daysExceeding35C measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

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best-practice metric for stress-testing in the financial sector.

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The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 20-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 50-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 100-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 200-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 500-yr return period (m)	0.03	0.03	0.03	0.03
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	92	93	93	93
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	102	102	103	103
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	114	115	116	116
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	134	135	136	137

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	155	157	158	159
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	185	187	188	189
Average annual wind speed (km/hr)	12	12	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	133	136	139	142
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	155	158	162	166
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	186	190	195	200
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	211	216	222	228
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	238	244	251	258
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	276	284	292	300
Total water equivalent precipitation for the year (mm)	1292	1278	1299	1320

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	5	6	7	9

Days per year with temperature above 38°C	1	1	1	2
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	6	6	7
Number of days per year where WBGT above 32°C	11	13	17	21
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	3	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	12.2	12.7	12.9	13.5
Days per year with temperature below 0°C	91	87	83	79
Days per year with temperature below -10°C	12	10	9	8
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	2.9	1.6	1.3	1.1
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.01	0.01	0.01	0.01

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.19	0.24	0.24	0.15

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.12	0.11	0.05	0.04
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	7	7	7	7

Bethel Building 3 Location

3 Berkshire Blvd Bethel CT US

(Coordinates: 41.4212, -73.4028)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Bethel Building 3** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 114,079 from **flood** events, a loss of USD 9,582 from **wind** events, a loss of USD 181 from a **wildfire** event, and a loss of USD 1,897 due to **heat stress**.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	86
Current Hazard Score (2020)	72
Change Score (2020-2050)	81
Percentile Overall Score Relative to Country:	98
Percentile Overall Score Relative to Admin1 level:	97

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	55	22	66	Elevated
Wind	33	43	79	Elevated
Heat	33	57	28	Low
Cold	73	-54	70	Elevated
Precipitation	45	60	42	Moderate
Wildfire	3	2	8	Lowest
Drought	14	42	47	Moderate
Hail	33	-69	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Bethel Building 3** has a percentile overall score of 97 relative to its admin level 1 for climate hazards and has a percentile overall score of 98 relative to its country. The location is at moderate risk for extreme precipitation, low risk for heat stress, moderate risk for drought, elevated risk for flooding, elevated risk for extreme winds, lowest risk for wildfires, and elevated risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Bethel Building 3**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 9 days per year exceeding 35°C (95°F) and 79 days per year below 0°C (32°F). The **Bethel Building 3** location may also experience roughly 229 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.74 meters of combined flooding. There is an annual wildfire probability of 0.01% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.68 m	0.69 m (1%)	0.74 m (9%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	134 km/hr	135 km/hr (1%)	137 km/hr (2%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (0%)	12 km/hr (0%)
Heat	Annual number of days above 35°C	5 days	6 days (23%)	9 days (81%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	11 days	13 days (16%)	21 days (84%)
	Cooling Degree Days	589 degree days	640 degree days (9%)	748 degree days (27%)
Cold	Annual number of days below 0°C	91 days	87 days (-4%)	79 days (-14%)
	Heating Degree Days	2772 degree days	2680 degree days (-3%)	2477 degree days (-11%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	212 mm	217 mm (2%)	229 mm (8%)
	Total water equivalent precipitation (in mm) for the year	1292 mm	1277 mm (-1%)	1319 mm (2%)
Wildfire	Annual probability of wildfires (in %)	0.01%	0.01% (0%)	0.01% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (6%)	0.1 (2%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.12 days	0.11 days (-8%)	0.04 days (-67%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Bethel Building 3**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 1 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 114,079 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 9,582 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 181 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0.36%	0.47%	0.06%	0.07%	0%	0%
Average Annual Damage (Contents)	0.36%	0.51%	0.03%	0.04%	0%	0%
Average Annual Damage (Inventory)	0.54%	0.77%	0.03%	0.04%	0%	0%

Average Annual Downtime	1 days	1 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	82,303	114,079	7,745	9,582	181	181

For **heat**, the annual electricity consumption for cooling is expected to go from 11,597 kWh in 2020 to 14,633 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,897 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,597	14,633
Average Annual Loss (Cooling, USD)	1,503	1,897
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 70,662 in 2020 to USD 205,460 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 19,566 in 2020 to USD 58,212 in 2050 and operative expenditures will go from USD 1,503 to USD 1,897 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 19,829,515 in 2020 and USD 41,232,235 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	70,662	205,460
Operational Revenue (OpRev, USD)	19,566	58,212
Operational Expenditures (OpEx, USD)	1,503	1,897






Technical Cost of Insurance (USD)	143,377	400,575
Non-climate Risk Adjusted Forecasted Value (USD)	21,025,000	44,764,512
Total Climate Risk Value Adjustment (USD)	1,195,485	3,532,277
Climate Adjusted Value (USD)⁴	19,829,515	41,232,235

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter's baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it's important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, WS_windSpeed50yr measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, HT_daysExceeding35C measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

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Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

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Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

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Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
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Depth of flooding at the 10-yr return period (m)	0.18	0.19	0.2	0.22
Depth of flooding at the 20-yr return period (m)	0.32	0.33	0.35	0.38
Depth of flooding at the 50-yr return period (m)	0.53	0.54	0.56	0.6
Depth of flooding at the 100-yr return period (m)	0.68	0.69	0.71	0.74
Depth of flooding at the 200-yr return period (m)	0.84	0.85	0.86	0.9
Depth of flooding at the 500-yr return period (m)	1.05	1.06	1.06	1.1
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	92	93	93	93
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	102	102	102	103
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	114	115	116	116
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	134	135	136	137

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	155	157	158	159
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	185	187	188	189
Average annual wind speed (km/hr)	12	12	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	133	136	139	142
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	155	159	163	167
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	186	191	196	201
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	212	217	223	229
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	239	245	252	259
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	277	285	293	301
Total water equivalent precipitation for the year (mm)	1292	1277	1299	1319

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	5	6	7	9

Days per year with temperature above 38°C	1	1	1	2
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	6	6	7
Number of days per year where WBGT above 32°C	11	13	17	21
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	3	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	12.3	12.7	12.9	13.5
Days per year with temperature below 0°C	91	87	82	79
Days per year with temperature below -10°C	11	10	9	8
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	2.9	1.6	1.3	1.1
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.01	0.01	0.01	0.01

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.19	0.24	0.24	0.15

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.12	0.11	0.05	0.04
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	7	7	7	7

Westborough Location

115 Flanders Road Suite Unit 202 and 140 Westborough MA US

(Coordinates: 42.2745, -71.5772)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Westborough** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 324 from **wind** events, a loss of USD 37 from a **wildfire** event, and a loss of USD 2,191 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	28
Current Hazard Score (2020)	30
Change Score (2020-2050)	40
Percentile Overall Score Relative to Country:	60
Percentile Overall Score Relative to Admin1 level:	16

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	31	22	59	Moderate
Heat	34	54	25	Low
Cold	76	-53	74	Elevated
Precipitation	45	55	38	Low
Wildfire	5	2	13	Lowest
Drought	44	44	62	Elevated
Hail	26	-59	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Westborough** has a percentile overall score of 16 relative to its admin level 1 for climate hazards and has a percentile overall score of 60 relative to its country. The location is at low risk for extreme precipitation, low risk for heat stress, elevated risk for drought, lowest risk for flooding, moderate risk for extreme winds, lowest risk for wildfires, and elevated risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Westborough**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 10 days per year exceeding 35°C (95°F) and 87 days per year below 0°C (32°F). The **Westborough** location may also experience roughly 227 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.01 meters of combined flooding. There is an annual wildfire probability of 0.02% predicted along with a 0.2 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.01 m	0.01 m (0%)	0.01 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	132 km/hr	133 km/hr (1%)	134 km/hr (1%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (0%)	12 km/hr (0%)
Heat	Annual number of days above 35°C	6 days	7 days (20%)	10 days (70%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	10 days	11 days (15%)	18 days (83%)
	Cooling Degree Days	573 degree days	619 degree days (8%)	725 degree days (27%)
Cold	Annual number of days below 0°C	100 days	96 days (-4%)	87 days (-12%)
	Heating Degree Days	2914 degree days	2820 degree days (-3%)	2612 degree days (-10%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	211 mm	216 mm (2%)	227 mm (8%)
	Total water equivalent precipitation (in mm) for the year	1145 mm	1141 mm (0%)	1166 mm (2%)
Wildfire	Annual probability of wildfires (in %)	0.02%	0.02% (0%)	0.02% (4%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.2	0.3 (11%)	0.2 (-7%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.07 days	0.05 days (-29%)	0.02 days (-71%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Westborough**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 324 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 37 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.06%	0.07%	0%	0%
Average Annual Damage (Contents)	0%	0%	0.03%	0.03%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0.03%	0.03%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	277	324	36	37

For **heat**, the annual electricity consumption for cooling is expected to go from 11,290 kWh in 2020 to 14,195 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 2,191 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,290	14,195
Average Annual Loss (Cooling, USD)	1,743	2,191
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 312 in 2020 to USD 769 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 1,743 to USD 2,191 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 1,013,029 in 2020 and USD 2,166,302 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	312	769
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	1,743	2,191






Technical Cost of Insurance (USD)	1,727	3,951
Non-climate Risk Adjusted Forecasted Value (USD)	1,040,000	2,214,273
Total Climate Risk Value Adjustment (USD)	26,971	47,971
Climate Adjusted Value (USD)⁴	1,013,029	2,166,302

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, WS_windSpeed50yr measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, HT_daysExceeding35C measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0	0	0	0
Depth of flooding at the 50-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 100-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 200-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 500-yr return period (m)	0.01	0.01	0.01	0.01
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	94	94	95	95
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	104	104	105	105
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	116	117	117	118
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	132	133	134	134

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	152	153	154	154
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	179	180	183	182
Average annual wind speed (km/hr)	12	12	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	133	136	139	142
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	155	158	162	166
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	186	190	195	200
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	211	216	222	227
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	238	244	250	257
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	276	283	291	299
Total water equivalent precipitation for the year (mm)	1145	1141	1162	1166

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	6	7	8	10

Days per year with temperature above 38°C	1	1	2	2
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	5	6	7
Number of days per year where WBGT above 32°C	10	11	14	18
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	4	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	11.8	12.1	12.4	13
Days per year with temperature below 0°C	100	96	91	87
Days per year with temperature below -10°C	16	14	12	11
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	4.5	2.9	2.3	1.9
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.02	0.02	0.02	0.02

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.2	0.3	0.2	0.2
Mean months per year where the rolling 6-month average SPEI is below -2	0.24	0.26	0.26	0.2

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.07	0.05	0.01	0.02
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	6	6	6	6

Costa Rica Building 1 Location

Zona Franca Coyol Alajuela AL CR

(Coordinates: 9.9915, -84.2788)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Costa Rica Building 1** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 19,204 from **wind** events, a loss of USD 0 from a **wildfire** event, and a loss of USD 6,278 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	40
Current Hazard Score (2020)	18
Change Score (2020-2050)	70
Percentile Overall Score Relative to Country:	25
Percentile Overall Score Relative to Admin1 level:	16

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	43	-1	47	Moderate
Heat	34	80	63	Elevated
Cold	0	0	0	Lowest
Precipitation	91	27	60	Elevated
Wildfire	0	0	0	Lowest
Drought	25	32	48	Moderate
Hail	0	0	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Costa Rica Building 1** has a percentile overall score of 16 relative to its admin level 1 for climate hazards and has a percentile overall score of 25 relative to its country. The location is at elevated risk for extreme precipitation, elevated risk for heat stress, moderate risk for drought, lowest risk for flooding, moderate risk for extreme winds, lowest risk for wildfires, and lowest risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Costa Rica Building 1**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 11 days per year exceeding 35°C (95°F) and 0 days per year below 0°C (32°F). The **Costa Rica Building 1** location may also experience roughly 513 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.01 meters of combined flooding. There is an annual wildfire probability of 0% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.01 m	0.01 m (0%)	0.01 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	146 km/hr	146 km/hr (0%)	146 km/hr (0%)
	Average annual wind speed (in km/hr)	6 km/hr	7 km/hr (5%)	7 km/hr (5%)
Heat	Annual number of days above 35°C	5 days	6 days (28%)	11 days (125%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	2 days	3 days (57%)	9 days (358%)
	Cooling Degree Days	1372 degree days	1461 degree days (6%)	1656 degree days (21%)
Cold	Annual number of days below 0°C	0 days	0 days (0%)	0 days (0%)
	Heating Degree Days	0 degree days	0 degree days (0%)	0 degree days (0%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	439 mm	462 mm (5%)	513 mm (17%)
	Total water equivalent precipitation (in mm) for the year	2738 mm	2719 mm (-1%)	2728 mm (0%)
Wildfire	Annual probability of wildfires (in %)	0%	0% (0%)	0% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (7%)	0.1 (10%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0 days	0 days (0%)	0 days (0%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Costa Rica Building 1**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 19,204 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 0 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.19%	0.19%	0%	0%
Average Annual Damage (Contents)	0%	0%	0.1%	0.1%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0.1%	0.1%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	19,296	19,204	0	0

For **heat**, the annual electricity consumption for cooling is expected to go from 26,403 kWh in 2020 to 31,707 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 6,278 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 1% in 2020 to 1% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	26,403	31,707
Average Annual Loss (Cooling, USD)	5,228	6,278
Average Annual Damage (Portion of Productivity Hours)	1%	1%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 10,321 in 2020 to USD 63,955 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 8,975 in 2020 to USD 55,614 in 2050 and operative expenditures will go from USD 5,228 to USD 6,278 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 19,602,640 in 2020 and USD 122,166,721 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	10,321	63,955
Operational Revenue (OpRev, USD)	8,975	55,614
Operational Expenditures (OpEx, USD)	5,228	6,278





Technical Cost of Insurance (USD)	39,643	246,094
Non-climate Risk Adjusted Forecasted Value (USD)	19,859,280	123,647,172
Total Climate Risk Value Adjustment (USD)	256,640	1,480,450
Climate Adjusted Value (USD)⁴	19,602,640	122,166,721

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0	0	0	0
Depth of flooding at the 50-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 100-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 200-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 500-yr return period (m)	0.01	0.01	0.01	0.01
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	105	105	105	105
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	118	118	118	117
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	134	134	134	134
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	146	146	146	146

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	158	158	158	158
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	174	174	174	174
Average annual wind speed (km/hr)	6	7	7	7

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	263	273	285	296
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	312	327	342	357
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	382	402	422	443
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	439	462	487	513
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	500	527	557	587
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	586	620	656	694
Total water equivalent precipitation for the year (mm)	2738	2719	2742	2728

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	5	6	8	11

Days per year with temperature above 38°C	0	0	0	1
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	9	11	15	18
Number of days per year where WBGT above 32°C	2	3	5	9
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	3	5	10	20
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	21.6	21.7	22	22.4
Days per year with temperature below 0°C	0	0	0	0
Days per year with temperature below -10°C	0	0	0	0
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	0	0	0	0
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0	0	0	0

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.39	0.33	0.43	0.64

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0	0	0	0
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	4	4	6	7

Costa Rica Building 2 Location

Zona Franca Coyol Alajuela AL CR

(Coordinates: 9.9904, -84.2786)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Costa Rica Building 2** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

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The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 5,945 from **wind** events, a loss of USD 0 from a **wildfire** event, and a loss of USD 6,274 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	49
Current Hazard Score (2020)	29
Change Score (2020-2050)	71
Percentile Overall Score Relative to Country:	40
Percentile Overall Score Relative to Admin1 level:	37

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	18	0	19	Lowest
Wind	43	0	48	Moderate
Heat	34	80	63	Elevated
Cold	0	0	0	Lowest
Precipitation	91	27	60	Elevated
Wildfire	0	0	0	Lowest
Drought	25	32	48	Moderate
Hail	0	0	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Costa Rica Building 2** has a percentile overall score of 37 relative to its admin level 1 for climate hazards and has a percentile overall score of 40 relative to its country. The location is at elevated risk for extreme precipitation, elevated risk for heat stress, moderate risk for drought, lowest risk for flooding, moderate risk for extreme winds, lowest risk for wildfires, and lowest risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Costa Rica Building 2**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 11 days per year exceeding 35°C (95°F) and 0 days per year below 0°C (32°F). The **Costa Rica Building 2** location may also experience roughly 514 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.04 meters of combined flooding. There is an annual wildfire probability of 0% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.04 m	0.04 m (0%)	0.04 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	146 km/hr	146 km/hr (0%)	146 km/hr (0%)
	Average annual wind speed (in km/hr)	6 km/hr	7 km/hr (5%)	7 km/hr (5%)
Heat	Annual number of days above 35°C	5 days	6 days (28%)	11 days (126%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	2 days	3 days (55%)	9 days (346%)
	Cooling Degree Days	1371 degree days	1460 degree days (6%)	1655 degree days (21%)
Cold	Annual number of days below 0°C	0 days	0 days (0%)	0 days (0%)
	Heating Degree Days	0 degree days	0 degree days (0%)	0 degree days (0%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	440 mm	463 mm (5%)	514 mm (17%)
	Total water equivalent precipitation (in mm) for the year	2750 mm	2731 mm (-1%)	2740 mm (0%)
Wildfire	Annual probability of wildfires (in %)	0%	0% (0%)	0% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (7%)	0.1 (10%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0 days	0 days (0%)	0 days (0%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Costa Rica Building 2**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 5,945 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 0 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.2%	0.2%	0%	0%
Average Annual Damage (Contents)	0%	0%	0.11%	0.11%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0.11%	0.11%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	5,962	5,945	0	0

For **heat**, the annual electricity consumption for cooling is expected to go from 26,385 kWh in 2020 to 31,689 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 6,274 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 1% in 2020 to 1% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	26,385	31,689
Average Annual Loss (Cooling, USD)	5,224	6,274
Average Annual Damage (Portion of Productivity Hours)	1%	1%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 5,962 in 2020 to USD 37,013 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 5,224 to USD 6,274 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 4,981,116 in 2020 and USD 31,136,059 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	5,962	37,013
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	5,224	6,274






Technical Cost of Insurance (USD)	12,598	78,317
Non-climate Risk Adjusted Forecasted Value (USD)	5,079,834	31,627,889
Total Climate Risk Value Adjustment (USD)	98,718	491,830
Climate Adjusted Value (USD)⁴	4,981,116	31,136,059

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 20-yr return period (m)	0.04	0.04	0.04	0.04
Depth of flooding at the 50-yr return period (m)	0.04	0.04	0.04	0.04
Depth of flooding at the 100-yr return period (m)	0.04	0.04	0.04	0.04
Depth of flooding at the 200-yr return period (m)	0.05	0.05	0.05	0.05
Depth of flooding at the 500-yr return period (m)	0.05	0.05	0.05	0.05
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	106	106	106	106
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	118	118	118	118
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	134	134	134	134
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	146	146	146	146

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	158	158	158	158
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	174	174	174	174
Average annual wind speed (km/hr)	6	7	7	7

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	263	274	285	297
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	313	327	342	358
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	383	402	423	444
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	440	463	488	514
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	501	528	558	588
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	587	622	658	695
Total water equivalent precipitation for the year (mm)	2750	2731	2754	2740

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	5	6	8	11

Days per year with temperature above 38°C	0	0	0	1
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	9	11	15	19
Number of days per year where WBGT above 32°C	2	3	5	9
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	3	5	10	20
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	21.6	21.7	22	22.4
Days per year with temperature below 0°C	0	0	0	0
Days per year with temperature below -10°C	0	0	0	0
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	0	0	0	0
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0	0	0	0

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.39	0.33	0.43	0.64

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0	0	0	0
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	4	4	6	7

Vancouver Location

13136 82A Avenue Surrey BC CA

(Coordinates: 49.1518, -122.8593)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Vancouver** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 115 from **wind** events, a loss of USD 0 from a **wildfire** event, and a loss of USD 400 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	7
Current Hazard Score (2020)	1
Change Score (2020-2050)	25
Percentile Overall Score Relative to Country:	58
Percentile Overall Score Relative to Admin1 level:	51

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	18	3	19	Lowest
Heat	5	55	9	Lowest
Cold	61	-59	59	Moderate
Precipitation	20	47	25	Low
Wildfire	0	0	0	Lowest
Drought	8	24	34	Low
Hail	0	0	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Vancouver** has a percentile overall score of 51 relative to its admin level 1 for climate hazards and has a percentile overall score of 58 relative to its country. The location is at low risk for extreme precipitation, lowest risk for heat stress, low risk for drought, lowest risk for flooding, lowest risk for extreme winds, lowest risk for wildfires, and moderate risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Vancouver**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 1 days per year exceeding 35°C (95°F) and 23 days per year below 0°C (32°F). The **Vancouver** location may also experience roughly 163 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.01 meters of combined flooding. There is an annual wildfire probability of 0% predicted along with a 0 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.01 m	0.01 m (0%)	0.01 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	114 km/hr	115 km/hr (0%)	115 km/hr (1%)
	Average annual wind speed (in km/hr)	8 km/hr	8 km/hr (0%)	8 km/hr (0%)
Heat	Annual number of days above 35°C	0 days	0 days (29%)	1 days (112%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	0 days	0 days (30%)	0 days (270%)
	Cooling Degree Days	173 degree days	198 degree days (14%)	275 degree days (59%)
Cold	Annual number of days below 0°C	40 days	38 days (-7%)	23 days (-44%)
	Heating Degree Days	2706 degree days	2587 degree days (-4%)	2340 degree days (-14%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	151 mm	155 mm (3%)	163 mm (8%)
	Total water equivalent precipitation (in mm) for the year	2281 mm	2283 mm (0%)	2292 mm (0%)
Wildfire	Annual probability of wildfires (in %)	0%	0% (0%)	0% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0	0 (7%)	0 (0%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0 days	0 days (0%)	0 days (0%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Vancouver**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 115 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 0 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.01%	0.01%	0%	0%
Average Annual Damage (Contents)	0%	0%	0%	0%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	102	115	0	0

For **heat**, the annual electricity consumption for cooling is expected to go from 3,521 kWh in 2020 to 5,527 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 400 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	3,521	5,527
Average Annual Loss (Cooling, USD)	255	400
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 102 in 2020 to USD 717 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 255 to USD 400 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 10,095,141 in 2020 and USD 62,860,501 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	102	717
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	255	400






Technical Cost of Insurance (USD)	292	2,069
Non-climate Risk Adjusted Forecasted Value (USD)	10,100,000	62,884,275
Total Climate Risk Value Adjustment (USD)	4,859	23,775
Climate Adjusted Value (USD)⁴	10,095,141	62,860,501

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0	0	0	0
Depth of flooding at the 50-yr return period (m)	0	0	0	0.01
Depth of flooding at the 100-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 200-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 500-yr return period (m)	0.01	0.01	0.01	0.01
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	85	86	86	86
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	94	94	95	95
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	106	106	106	106
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	114	115	115	115

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	123	123	124	124
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	134	135	135	135
Average annual wind speed (km/hr)	8	8	8	8

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	100	103	105	108
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	114	117	120	123
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	134	138	142	145
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	151	155	159	163
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	168	173	177	182
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	193	198	204	209
Total water equivalent precipitation for the year (mm)	2281	2283	2284	2292

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	0	0	1	1

Days per year with temperature above 38°C	0	0	0	0
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	7	7	8	9
Number of days per year where WBGT above 32°C	0	0	0	0
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	3	5
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	11.4	11.7	12.3	12.7
Days per year with temperature below 0°C	40	38	30	23
Days per year with temperature below -10°C	1	1	0	0
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	1.2	1	0.8	0.6
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	5.6	5.1	4.4	3

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0	0	0	0

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0	0	0	0
Mean months per year where the rolling 6-month average SPEI is below -2	0.38	0.33	0.32	0.29

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0	0	0	0
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	0	0	0	0

Montreal Location

3700 St-Patrick; Suites 120,118C, 117, 118F, 102, 102A Montreal QC CA

(Coordinates: 45.4707, -73.5799)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Montreal** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 66 from **wind** events, a loss of USD 0 from a **wildfire** event, and a loss of USD 694 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	23
Current Hazard Score (2020)	8
Change Score (2020-2050)	54
Percentile Overall Score Relative to Country:	82
Percentile Overall Score Relative to Admin1 level:	79

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	20	27	53	Moderate
Heat	24	65	27	Low
Cold	86	-36	85	Severe
Precipitation	16	38	19	Lowest
Wildfire	0	0	0	Lowest
Drought	1	3	10	Lowest
Hail	17	-20	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Montreal** has a percentile overall score of 79 relative to its admin level 1 for climate hazards and has a percentile overall score of 82 relative to its country. The location is at lowest risk for extreme precipitation, low risk for heat stress, lowest risk for drought, lowest risk for flooding, moderate risk for extreme winds, lowest risk for wildfires, and severe risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Montreal**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 4 days per year exceeding 35°C (95°F) and 114 days per year below 0°C (32°F). The **Montreal** location may also experience roughly 147 mm of maximum daily precipitation at the 100-year return period by 2050 and 0 meters of combined flooding. There is an annual wildfire probability of 0% predicted along with a 0 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0 m	0 m (0%)	0 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	119 km/hr	120 km/hr (1%)	122 km/hr (2%)
	Average annual wind speed (in km/hr)	13 km/hr	13 km/hr (0%)	13 km/hr (0%)
Heat	Annual number of days above 35°C	2 days	3 days (28%)	4 days (109%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	6 days	8 days (23%)	13 days (106%)
	Cooling Degree Days	424 degree days	470 degree days (11%)	577 degree days (36%)
Cold	Annual number of days below 0°C	123 days	120 days (-2%)	114 days (-7%)
	Heating Degree Days	3795 degree days	3674 degree days (-3%)	3404 degree days (-10%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	138 mm	141 mm (2%)	147 mm (7%)
	Total water equivalent precipitation (in mm) for the year	1132 mm	1146 mm (1%)	1175 mm (4%)
Wildfire	Annual probability of wildfires (in %)	0%	0% (0%)	0% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0	0 (0%)	0 (14%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.01 days	0 days (-100%)	0 days (-100%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Montreal**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 66 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 0 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.01%	0.01%	0%	0%
Average Annual Damage (Contents)	0%	0%	0%	0%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	43	66	0	0

For **heat**, the annual electricity consumption for cooling is expected to go from 8,423 kWh in 2020 to 11,367 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 694 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	8,423	11,367
Average Annual Loss (Cooling, USD)	514	694
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 43 in 2020 to USD 409 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 514 to USD 694 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 2,994,893 in 2020 and USD 18,660,978 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	43	409
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	514	694






Technical Cost of Insurance (USD)	116	1,171
Non-climate Risk Adjusted Forecasted Value (USD)	3,000,000	18,678,498
Total Climate Risk Value Adjustment (USD)	5,107	17,520
Climate Adjusted Value (USD)⁴	2,994,893	18,660,978

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






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Moderate	
Elevated	
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Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

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SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

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Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

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Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0	0	0	0
Depth of flooding at the 50-yr return period (m)	0	0	0	0
Depth of flooding at the 100-yr return period (m)	0	0	0	0
Depth of flooding at the 200-yr return period (m)	0	0	0	0
Depth of flooding at the 500-yr return period (m)	0	0	0	0
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	91	92	92	93
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	100	100	101	102
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	111	112	112	113
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	119	120	121	122

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	127	128	129	131
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	138	139	141	142
Average annual wind speed (km/hr)	13	13	13	13

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	89	91	93	95
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	103	105	107	110
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	122	125	128	130
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	138	141	144	147
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	155	158	162	165
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	179	183	187	191
Total water equivalent precipitation for the year (mm)	1132	1146	1161	1175

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	2	3	3	4

Days per year with temperature above 38°C	0	0	1	1
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	5	6	6
Number of days per year where WBGT above 32°C	6	8	10	13
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	2	4
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	8.9	9.2	9.6	10.1
Days per year with temperature below 0°C	123	120	117	114
Days per year with temperature below -10°C	49	46	42	38
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	28	24.2	20.2	18
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0.1	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0	0	0	0

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0	0	0	0
Mean months per year where the rolling 6-month average SPEI is below -2	0.21	0.25	0.28	0.32

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.01	0	0.01	0
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	5	5	5	5

Menlo Park Location

4065 Campbell Avenue Tract No 750 - Unit No. 1 Menlo Park CA US

(Coordinates: 37.481, -122.1811)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Menlo Park** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics,

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to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 68 from **wind** events, a loss of USD 309 from a **wildfire** event, and a loss of USD 1,450 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	21
Current Hazard Score (2020)	1
Change Score (2020-2050)	57
Percentile Overall Score Relative to Country:	49
Percentile Overall Score Relative to Admin1 level:	32

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	19	6	22	Low
Heat	15	52	12	Lowest
Cold	26	-28	30	Low
Precipitation	18	52	26	Low
Wildfire	3	0	5	Lowest
Drought	39	50	64	Elevated
Hail	0	0	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Menlo Park** has a percentile overall score of 32 relative to its admin level 1 for climate hazards and has a percentile overall score of 49 relative to its country. The location is at low risk for extreme precipitation, lowest risk for heat stress, elevated risk for drought, lowest risk for flooding, low risk for extreme winds, lowest risk for wildfires, and low risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Menlo Park**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 3 days per year exceeding 35°C (95°F) and 1 days per year below 0°C (32°F). The **Menlo Park** location may also experience roughly 158 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.01 meters of combined flooding. There is an annual wildfire probability of 0.02% predicted along with a 0.2 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.01 m	0.01 m (0%)	0.01 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	115 km/hr	116 km/hr (0%)	117 km/hr (1%)
	Average annual wind speed (in km/hr)	8 km/hr	8 km/hr (0%)	8 km/hr (0%)
Heat	Annual number of days above 35°C	2 days	3 days (13%)	3 days (47%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	0 days	0 days (29%)	1 days (142%)
	Cooling Degree Days	363 degree days	398 degree days (10%)	502 degree days (38%)
Cold	Annual number of days below 0°C	1 days	1 days (-9%)	1 days (-32%)
	Heating Degree Days	1164 degree days	1101 degree days (-5%)	963 degree days (-17%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	144 mm	148 mm (3%)	158 mm (10%)
	Total water equivalent precipitation (in mm) for the year	519 mm	514 mm (-1%)	531 mm (2%)
Wildfire	Annual probability of wildfires (in %)	0.02%	0.02% (0%)	0.02% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.2	0.2 (-1%)	0.2 (9%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0 days	0 days (0%)	0 days (0%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Menlo Park**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 68 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 309 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.01%	0.01%	0.01%	0.01%
Average Annual Damage (Contents)	0%	0%	0%	0%	0.01%	0.01%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0.01%	0.01%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	57	68	309	309

For **heat**, the annual electricity consumption for cooling is expected to go from 7,241 kWh in 2020 to 9,927 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,450 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	7,241	9,927
Average Annual Loss (Cooling, USD)	1,058	1,450
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 211 in 2020 to USD 463 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 155 in 2020 to USD 340 in 2050 and operative expenditures will go from USD 1,058 to USD 1,450 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 2,556,192 in 2020 and USD 5,449,731 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	211	463
Operational Revenue (OpRev, USD)	155	340
Operational Expenditures (OpEx, USD)	1,058	1,450





Technical Cost of Insurance (USD)	4,420	9,434
Non-climate Risk Adjusted Forecasted Value (USD)	2,600,000	5,535,683
Total Climate Risk Value Adjustment (USD)	43,808	85,952
Climate Adjusted Value (USD)⁴	2,556,192	5,449,731

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

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Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 20-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 50-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 100-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 200-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 500-yr return period (m)	0.01	0.01	0.01	0.01
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	85	85	86	86
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	94	95	95	95
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	106	107	107	108
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	115	116	116	117

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	124	125	125	126
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	136	137	137	138
Average annual wind speed (km/hr)	8	8	8	8

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	89	92	94	97
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	104	108	111	114
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	126	130	134	139
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	144	148	153	158
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	163	168	174	179
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	190	196	203	209
Total water equivalent precipitation for the year (mm)	519	514	524	531

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	2	3	3	3

Days per year with temperature above 38°C	0	0	0	0
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	7	7	8	9
Number of days per year where WBGT above 32°C	0	0	0	1
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	2	4	4	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	15.3	15.6	15.8	16.3
Days per year with temperature below 0°C	1	1	1	1
Days per year with temperature below -10°C	0	0	0	0
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	0	0	0	0
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	3.5	3.1	2.6	1.6

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.02	0.02	0.02	0.02

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.2	0.2	0.2	0.2
Mean months per year where the rolling 6-month average SPEI is below -2	0.12	0.12	0.13	0.16

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0	0	0	0
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	0	0	0	0

Hudson Building 1 Location

2251 Willis Miller Dr. Hudson WI US

(Coordinates: 44.9426, -92.7024)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Hudson** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 949 from **wind** events, a loss of USD 728 from a **wildfire** event, and a loss of USD 1,116 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	53
Current Hazard Score (2020)	61
Change Score (2020-2050)	45
Percentile Overall Score Relative to Country:	85
Percentile Overall Score Relative to Admin1 level:	81

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	20	0	22	Low
Wind	20	22	46	Moderate
Heat	34	60	33	Low
Cold	86	-34	85	Severe
Precipitation	29	44	27	Low
Wildfire	9	6	27	Low
Drought	90	1	76	Elevated
Hail	75	-44	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Hudson** has a percentile overall score of 81 relative to its admin level 1 for climate hazards and has a percentile overall score of 85 relative to its country. The location is at low risk for extreme precipitation, low risk for heat stress, elevated risk for drought, low risk for flooding, moderate risk for extreme winds, low risk for wildfires, and severe risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Hudson**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 10 days per year exceeding 35°C (95°F) and 116 days per year below 0°C (32°F). The **Hudson** location may also experience roughly 182 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.06 meters of combined flooding. There is an annual wildfire probability of 0.05% predicted along with a 1.6 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.06 m	0.06 m (0%)	0.06 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	-9999 m	-9999 m (0%)	-9999 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	119 km/hr	120 km/hr (1%)	121 km/hr (2%)
	Average annual wind speed (in km/hr)	13 km/hr	13 km/hr (0%)	12 km/hr (-3%)
Heat	Annual number of days above 35°C	6 days	7 days (23%)	10 days (85%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	13 days	15 days (19%)	23 days (82%)
	Cooling Degree Days	576 degree days	630 degree days (9%)	752 degree days (31%)
Cold	Annual number of days below 0°C	125 days	122 days (-3%)	116 days (-8%)
	Heating Degree Days	3743 degree days	3617 degree days (-3%)	3369 degree days (-10%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	171 mm	175 mm (2%)	182 mm (6%)
	Total water equivalent precipitation (in mm) for the year	912 mm	912 mm (0%)	911 mm (0%)
Wildfire	Annual probability of wildfires (in %)	0.04%	0.05% (2%)	0.05% (7%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	1.4	1.6 (11%)	1.6 (14%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	1.29 days	1.3 days (1%)	1 days (-22%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Hudson**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 949 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 728 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.02%	0.02%	0.01%	0.01%
Average Annual Damage (Contents)	0%	0%	0.01%	0.01%	0.01%	0.01%
Average Annual Damage (Inventory)	0%	0%	0.01%	0.01%	0.01%	0.01%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	721	949	683	728

For **heat**, the annual electricity consumption for cooling is expected to go from 11,348 kWh in 2020 to 14,709 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,116 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,348	14,709
Average Annual Loss (Cooling, USD)	861	1,116
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 1,403 in 2020 to USD 3,572 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 861 to USD 1,116 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 8,193,768 in 2020 and USD 17,444,894 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	1,403	3,572
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	861	1,116






Technical Cost of Insurance (USD)	11,550	25,733
Non-climate Risk Adjusted Forecasted Value (USD)	8,294,569	17,660,040
Total Climate Risk Value Adjustment (USD)	100,801	215,146
Climate Adjusted Value (USD)⁴	8,193,768	17,444,894

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

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best-practice metric for stress-testing in the financial sector.

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Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

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The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 20-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 50-yr return period (m)	0.05	0.05	0.05	0.05
Depth of flooding at the 100-yr return period (m)	0.06	0.06	0.06	0.06
Depth of flooding at the 200-yr return period (m)	0.06	0.06	0.06	0.06
Depth of flooding at the 500-yr return period (m)	0.06	0.06	0.06	0.06
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	-9999	-9999	-9999	-9999

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	91	91	92	92
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	100	100	101	101
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	111	111	112	113
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	119	120	120	121

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	127	128	129	130
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	138	139	140	141
Average annual wind speed (km/hr)	13	13	13	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	108	110	111	113
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	125	128	130	133
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	151	154	157	160
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	171	175	179	182
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	193	197	202	206
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	224	229	235	240
Total water equivalent precipitation for the year (mm)	912	912	906	911

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	6	7	9	10

Days per year with temperature above 38°C	1	1	2	2
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	5	6	6
Number of days per year where WBGT above 32°C	13	15	20	23
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	2	3	5	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	9.1	9.7	10.1	10.6
Days per year with temperature below 0°C	125	122	118	116
Days per year with temperature below -10°C	51	48	45	42
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	28.6	24.4	21.6	19.1
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.04	0.05	0.05	0.05

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	1.4	1.6	1.6	1.6
Mean months per year where the rolling 6-month average SPEI is below -2	0.19	0.18	0.19	0.16

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	1.29	1.3	1.25	1
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	19	20	20	19

Hudson Building 2 Location

2329-2333 Willis Miller Dr. Hudson WI US

(Coordinates: 44.9426, -92.7024)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Hudson** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 80 from **wind** events, a loss of USD 99 from a **wildfire** event, and a loss of USD 1,116 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	53
Current Hazard Score (2020)	61
Change Score (2020-2050)	45
Percentile Overall Score Relative to Country:	85
Percentile Overall Score Relative to Admin1 level:	81

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	20	0	22	Low
Wind	20	22	46	Moderate
Heat	34	60	33	Low
Cold	86	-34	85	Severe
Precipitation	29	44	27	Low
Wildfire	9	6	27	Low
Drought	90	1	76	Elevated
Hail	75	-44	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Hudson** has a percentile overall score of 81 relative to its admin level 1 for climate hazards and has a percentile overall score of 85 relative to its country. The location is at low risk for extreme precipitation, low risk for heat stress, elevated risk for drought, low risk for flooding, moderate risk for extreme winds, low risk for wildfires, and severe risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Hudson**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 10 days per year exceeding 35°C (95°F) and 116 days per year below 0°C (32°F). The **Hudson** location may also experience roughly 182 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.06 meters of combined flooding. There is an annual wildfire probability of 0.05% predicted along with a 1.6 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.06 m	0.06 m (0%)	0.06 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	-9999 m	-9999 m (0%)	-9999 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	119 km/hr	120 km/hr (1%)	121 km/hr (2%)
	Average annual wind speed (in km/hr)	13 km/hr	13 km/hr (0%)	12 km/hr (-3%)
Heat	Annual number of days above 35°C	6 days	7 days (23%)	10 days (85%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	13 days	15 days (19%)	23 days (82%)
	Cooling Degree Days	576 degree days	630 degree days (9%)	752 degree days (31%)
Cold	Annual number of days below 0°C	125 days	122 days (-3%)	116 days (-8%)
	Heating Degree Days	3743 degree days	3617 degree days (-3%)	3369 degree days (-10%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	171 mm	175 mm (2%)	182 mm (6%)
	Total water equivalent precipitation (in mm) for the year	912 mm	912 mm (0%)	911 mm (0%)
Wildfire	Annual probability of wildfires (in %)	0.04%	0.05% (2%)	0.05% (7%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	1.4	1.6 (11%)	1.6 (14%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	1.29 days	1.3 days (1%)	1 days (-22%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Hudson**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 80 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 99 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.02%	0.02%	0.01%	0.01%
Average Annual Damage (Contents)	0%	0%	0.01%	0.01%	0.01%	0.01%
Average Annual Damage (Inventory)	0%	0%	0.01%	0.01%	0.01%	0.01%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	58	80	93	99

For **heat**, the annual electricity consumption for cooling is expected to go from 11,348 kWh in 2020 to 14,709 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,116 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,348	14,709
Average Annual Loss (Cooling, USD)	861	1,116
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 150 in 2020 to USD 381 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 861 to USD 1,116 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 1,100,736 in 2020 and USD 2,347,805 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	150	381
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	861	1,116






Technical Cost of Insurance (USD)	2,194	4,881
Non-climate Risk Adjusted Forecasted Value (USD)	1,125,000	2,395,247
Total Climate Risk Value Adjustment (USD)	24,264	47,443
Climate Adjusted Value (USD)⁴	1,100,736	2,347,805

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

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Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

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Depth of flooding at the 10-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 20-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 50-yr return period (m)	0.05	0.05	0.05	0.05
Depth of flooding at the 100-yr return period (m)	0.06	0.06	0.06	0.06
Depth of flooding at the 200-yr return period (m)	0.06	0.06	0.06	0.06
Depth of flooding at the 500-yr return period (m)	0.06	0.06	0.06	0.06
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	-9999	-9999	-9999	-9999

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	91	91	92	92
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	100	100	101	101
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	111	111	112	113
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	119	120	120	121

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	127	128	129	130
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	138	139	140	141
Average annual wind speed (km/hr)	13	13	13	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	108	110	111	113
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	125	128	130	133
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	151	154	157	160
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	171	175	179	182
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	193	197	202	206
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	224	229	235	240
Total water equivalent precipitation for the year (mm)	912	912	906	911

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	6	7	9	10

Days per year with temperature above 38°C	1	1	2	2
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	5	6	6
Number of days per year where WBGT above 32°C	13	15	20	23
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	2	3	5	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	9.1	9.7	10.1	10.6
Days per year with temperature below 0°C	125	122	118	116
Days per year with temperature below -10°C	51	48	45	42
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	28.6	24.4	21.6	19.1
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.04	0.05	0.05	0.05

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	1.4	1.6	1.6	1.6
Mean months per year where the rolling 6-month average SPEI is below -2	0.19	0.18	0.19	0.16

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	1.29	1.3	1.25	1
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	19	20	20	19

Quebec Location

450-500 St- Jean-Baptiste Avenue Suite 194, 195 Quebec City QC CA

(Coordinates: 46.7994, -71.3238)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Quebec** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 74,742 from **flood** events, a loss of USD 54 from **wind** events, a loss of USD 57 from a **wildfire** event, and a loss of USD 440 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	55
Current Hazard Score (2020)	46
Change Score (2020-2050)	62
Percentile Overall Score Relative to Country:	97
Percentile Overall Score Relative to Admin1 level:	98

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	69	-1	61	Elevated
Wind	18	26	49	Moderate
Heat	13	70	21	Low
Cold	92	-36	91	Severe
Precipitation	14	38	19	Lowest
Wildfire	1	0	1	Lowest
Drought	2	3	12	Lowest
Hail	6	0	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Quebec** has a percentile overall score of 98 relative to its admin level 1 for climate hazards and has a percentile overall score of 97 relative to its country. The location is at lowest risk for extreme precipitation, low risk for heat stress, lowest risk for drought, elevated risk for flooding, moderate risk for extreme winds, lowest risk for wildfires, and severe risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Quebec**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 2 days per year exceeding 35°C (95°F) and 137 days per year below 0°C (32°F). The **Quebec** location may also experience roughly 144 mm of maximum daily precipitation at the 100-year return period by 2050 and 1.1 meters of combined flooding. There is an annual wildfire probability of 0% predicted along with a 0 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	1.12 m	1.11 m (-1%)	1.1 m (-2%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	114 km/hr	116 km/hr (1%)	119 km/hr (4%)
	Average annual wind speed (in km/hr)	11 km/hr	11 km/hr (0%)	11 km/hr (0%)
Heat	Annual number of days above 35°C	1 days	1 days (30%)	2 days (116%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	2 days	3 days (32%)	5 days (154%)
	Cooling Degree Days	241 degree days	276 degree days (15%)	361 degree days (50%)
Cold	Annual number of days below 0°C	147 days	145 days (-1%)	137 days (-7%)
	Heating Degree Days	4441 degree days	4316 degree days (-3%)	4020 degree days (-9%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	136 mm	138 mm (1%)	144 mm (6%)
	Total water equivalent precipitation (in mm) for the year	1286 mm	1293 mm (1%)	1337 mm (4%)
Wildfire	Annual probability of wildfires (in %)	0%	0% (0%)	0% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0	0 (-10%)	0 (-10%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.01 days	0 days (-100%)	0 days (-100%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Quebec**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 3 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 74,742 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 54 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 57 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	1.5%	1.48%	0.01%	0.01%	0%	0%
Average Annual Damage (Contents)	2.76%	2.68%	0%	0%	0%	0%
Average Annual Damage (Inventory)	3.86%	3.76%	0%	0%	0%	0%

Average Annual Downtime	3 days	3 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	76,957	74,742	28	54	57	57

For **heat**, the annual electricity consumption for cooling is expected to go from 4,861 kWh in 2020 to 7,202 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 440 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	4,861	7,202
Average Annual Loss (Cooling, USD)	297	440
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 77,042 in 2020 to USD 466,043 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 297 to USD 440 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 1,594,204 in 2020 and USD 10,063,759 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	77,042	466,043
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	297	440






Technical Cost of Insurance (USD)	123,904	749,440
Non-climate Risk Adjusted Forecasted Value (USD)	2,792,000	17,383,455
Total Climate Risk Value Adjustment (USD)	1,197,796	7,319,697
Climate Adjusted Value (USD)⁴	1,594,204	10,063,759

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.99	0.98	0.97	0.97
Depth of flooding at the 20-yr return period (m)	1.03	1.02	1.02	1.01
Depth of flooding at the 50-yr return period (m)	1.08	1.08	1.07	1.06
Depth of flooding at the 100-yr return period (m)	1.12	1.11	1.1	1.1
Depth of flooding at the 200-yr return period (m)	1.16	1.15	1.14	1.13
Depth of flooding at the 500-yr return period (m)	1.2	1.19	1.18	1.17
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	88	89	90	91
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	96	97	98	100
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	106	108	109	111
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	114	116	117	119

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	122	124	125	127
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	132	134	136	138
Average annual wind speed (km/hr)	11	11	11	11

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	88	90	92	94
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	102	104	106	108
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	120	123	125	128
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	136	138	141	144
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	152	155	158	162
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	175	179	183	186
Total water equivalent precipitation for the year (mm)	1286	1293	1322	1337

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	1	1	1	2

Days per year with temperature above 38°C	0	0	0	0
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	5	5	6
Number of days per year where WBGT above 32°C	2	3	3	5
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	2	4
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	6.7	7.1	7.5	8
Days per year with temperature below 0°C	147	145	140	137
Days per year with temperature below -10°C	65	61	57	53
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	45.2	42.1	36.5	35.4
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0.1	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0	0	0	0

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0	0	0	0
Mean months per year where the rolling 6-month average SPEI is below -2	0.2	0.21	0.22	0.25

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.01	0	0	0
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	4	4	4	4

San Diego Location

10540 Heater Court San Diego CA US

(Coordinates: 32.908, -117.1731)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **San Diego** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 6 from **wind** events, a loss of USD 752 from a **wildfire** event, and a loss of USD 2,230 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	29
Current Hazard Score (2020)	6
Change Score (2020-2050)	67
Percentile Overall Score Relative to Country:	62
Percentile Overall Score Relative to Admin1 level:	44

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	15	3	13	Lowest
Heat	20	62	21	Low
Cold	19	-28	23	Low
Precipitation	12	35	17	Lowest
Wildfire	25	34	57	Moderate
Drought	100	0	86	Severe
Hail	9	32	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **San Diego** has a percentile overall score of 44 relative to its admin level 1 for climate hazards and has a percentile overall score of 62 relative to its country. The location is at lowest risk for extreme precipitation, low risk for heat stress, severe risk for drought, lowest risk for flooding, lowest risk for extreme winds, moderate risk for wildfires, and low risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **San Diego**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 2 days per year exceeding 35°C (95°F) and 0 days per year below 0°C (32°F). The **San Diego** location may also experience roughly 139 mm of maximum daily precipitation at the 100-year return period by 2050 and 0 meters of combined flooding. There is an annual wildfire probability of 0.14% predicted along with a 8.2 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0 m	0 m (0%)	0 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	104 km/hr	104 km/hr (0%)	105 km/hr (1%)
	Average annual wind speed (in km/hr)	9 km/hr	9 km/hr (0%)	9 km/hr (0%)
Heat	Annual number of days above 35°C	1 days	2 days (18%)	2 days (65%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	2 days	2 days (22%)	3 days (115%)
	Cooling Degree Days	595 degree days	645 degree days (8%)	781 degree days (31%)
Cold	Annual number of days below 0°C	0 days	0 days (-9%)	0 days (-36%)
	Heating Degree Days	634 degree days	578 degree days (-9%)	473 degree days (-25%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	131 mm	134 mm (2%)	139 mm (6%)
	Total water equivalent precipitation (in mm) for the year	322 mm	313 mm (-3%)	327 mm (2%)
Wildfire	Annual probability of wildfires (in %)	0.13%	0.13% (5%)	0.14% (13%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	9999	9999 (0%)	8.2 (-100%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.01 days	0.01 days (0%)	0.01 days (0%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **San Diego**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 6 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 752 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0%	0.01%	0.08%	0.09%
Average Annual Damage (Contents)	0%	0%	0%	0%	0.08%	0.09%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0.08%	0.09%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	6	6	667	752

For **heat**, the annual electricity consumption for cooling is expected to go from 11,712 kWh in 2020 to 15,260 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 2,230 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,712	15,260
Average Annual Loss (Cooling, USD)	1,711	2,230
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 673 in 2020 to USD 1,615 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 1,711 to USD 2,230 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 743,833 in 2020 and USD 1,590,522 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	673	1,615
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	1,711	2,230






Technical Cost of Insurance (USD)	5,292	12,054
Non-climate Risk Adjusted Forecasted Value (USD)	800,000	1,703,287
Total Climate Risk Value Adjustment (USD)	56,167	112,765
Climate Adjusted Value (USD)⁴	743,833	1,590,522

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0	0	0	0
Depth of flooding at the 50-yr return period (m)	0	0	0	0
Depth of flooding at the 100-yr return period (m)	0	0	0	0
Depth of flooding at the 200-yr return period (m)	0	0	0	0
Depth of flooding at the 500-yr return period (m)	0	0	0	0
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	77	77	77	77
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	85	85	85	85
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	96	96	96	97
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	104	104	105	105

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	112	112	113	113
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	123	123	124	124
Average annual wind speed (km/hr)	9	9	9	9

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	78	80	81	83
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	93	95	97	99
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	114	116	119	121
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	131	134	136	139
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	149	152	155	159
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	175	179	183	187
Total water equivalent precipitation for the year (mm)	322	313	333	327

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	1	2	2	2

Days per year with temperature above 38°C	0	0	0	0
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	7	8	9	11
Number of days per year where WBGT above 32°C	2	2	2	3
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	5	6	7	10
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	17.8	18.1	18.3	18.7
Days per year with temperature below 0°C	0	0	0	0
Days per year with temperature below -10°C	0	0	0	0
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	0	0	0	0
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	1.5	1.3	0.7	0.5

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.13	0.13	0.14	0.14

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	9999	9999	9999	8.2
Mean months per year where the rolling 6-month average SPEI is below -2	0.2	0.22	0.24	0.28

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.01	0.01	0.01	0.01
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	2	2	2	2

Hutchinson Location

40 West Highland Park Drive NE Hutchinson MN US

(Coordinates: 44.8988, -94.3541)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Hutchinson** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 324 from **wind** events, a loss of USD 600 from a **wildfire** event, and a loss of USD 1,213 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	33
Current Hazard Score (2020)	39
Change Score (2020-2050)	39
Percentile Overall Score Relative to Country:	67
Percentile Overall Score Relative to Admin1 level:	34

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	19	-4	9	Lowest
Heat	36	60	34	Low
Cold	86	-33	86	Severe
Precipitation	35	44	30	Low
Wildfire	3	2	9	Lowest
Drought	63	69	96	Severe
Hail	84	-46	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Hutchinson** has a percentile overall score of 34 relative to its admin level 1 for climate hazards and has a percentile overall score of 67 relative to its country. The location is at low risk for extreme precipitation, low risk for heat stress, severe risk for drought, lowest risk for flooding, lowest risk for extreme winds, lowest risk for wildfires, and severe risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Hutchinson**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 13 days per year exceeding 35°C (95°F) and 120 days per year below 0°C (32°F). The **Hutchinson** location may also experience roughly 199 mm of maximum daily precipitation at the 100-year return period by 2050 and 0 meters of combined flooding. There is an annual wildfire probability of 0.02% predicted along with a 0.6 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0 m	0 m (0%)	0 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	-9999 m	-9999 m (0%)	-9999 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	116 km/hr	116 km/hr (0%)	115 km/hr (-1%)
	Average annual wind speed (in km/hr)	15 km/hr	15 km/hr (0%)	14 km/hr (-3%)
Heat	Annual number of days above 35°C	7 days	9 days (21%)	13 days (79%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	16 days	19 days (17%)	27 days (70%)
	Cooling Degree Days	592 degree days	649 degree days (10%)	772 degree days (30%)
Cold	Annual number of days below 0°C	129 days	126 days (-2%)	120 days (-7%)
	Heating Degree Days	3810 degree days	3684 degree days (-3%)	3440 degree days (-10%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	188 mm	191 mm (2%)	199 mm (6%)
	Total water equivalent precipitation (in mm) for the year	881 mm	874 mm (-1%)	883 mm (0%)
Wildfire	Annual probability of wildfires (in %)	0.02%	0.02% (0%)	0.02% (6%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.4	0.3 (-4%)	0.6 (64%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	1.96 days	1.93 days (-2%)	1.7 days (-13%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Hutchinson**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 324 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 600 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.01%	0.01%	0.01%	0.01%
Average Annual Damage (Contents)	0%	0%	0%	0%	0.01%	0.01%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0.01%	0.01%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	373	324	565	600

For **heat**, the annual electricity consumption for cooling is expected to go from 11,654 kWh in 2020 to 15,089 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,213 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,654	15,089
Average Annual Loss (Cooling, USD)	937	1,213
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 937 in 2020 to USD 1,968 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 937 to USD 1,213 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 8,468,064 in 2020 and USD 18,033,939 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	937	1,968
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	937	1,213






Technical Cost of Insurance (USD)	14,127	30,900
Non-climate Risk Adjusted Forecasted Value (USD)	8,590,000	18,289,045
Total Climate Risk Value Adjustment (USD)	121,936	255,105
Climate Adjusted Value (USD)⁴	8,468,064	18,033,939

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0	0	0	0
Depth of flooding at the 50-yr return period (m)	0	0	0	0
Depth of flooding at the 100-yr return period (m)	0	0	0	0
Depth of flooding at the 200-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 500-yr return period (m)	0.01	0.01	0.01	0.01
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	-9999	-9999	-9999	-9999

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	90	90	89	89
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	98	98	97	97
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	108	108	108	107
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	116	116	115	115

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	124	123	123	123
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	134	134	133	133
Average annual wind speed (km/hr)	15	15	14	14

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	116	118	120	122
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	136	138	141	143
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	165	168	171	174
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	188	191	195	199
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	213	217	221	225
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	248	253	258	263
Total water equivalent precipitation for the year (mm)	881	874	876	883

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	7	9	11	13

Days per year with temperature above 38°C	2	2	2	3
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	5	5	6
Number of days per year where WBGT above 32°C	16	19	24	27
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	3	4	5	7
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	9	9.5	9.8	10.4
Days per year with temperature below 0°C	129	126	122	120
Days per year with temperature below -10°C	55	51	48	44
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	30.6	25.8	24.2	21.6
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.5	0.3	0.1	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.02	0.02	0.02	0.02

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.4	0.3	0.5	0.6
Mean months per year where the rolling 6-month average SPEI is below -2	0.14	0.15	0.18	0.15

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	1.96	1.93	1.98	1.7
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	25	25	25	24

Blaine Location

3761 95th Avenue NE Blaine MN US

(Coordinates: 45.1427, -93.1745)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Blaine** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 1,017 from **wind** events, a loss of USD 2,594 from a **wildfire** event, and a loss of USD 1,236 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	56
Current Hazard Score (2020)	42
Change Score (2020-2050)	68
Percentile Overall Score Relative to Country:	87
Percentile Overall Score Relative to Admin1 level:	62

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	19	18	40	Moderate
Heat	35	60	33	Low
Cold	86	-34	85	Severe
Precipitation	31	46	29	Low
Wildfire	11	11	34	Low
Drought	76	77	99	Severe
Hail	77	-43	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Blaine** has a percentile overall score of 62 relative to its admin level 1 for climate hazards and has a percentile overall score of 87 relative to its country. The location is at low risk for extreme precipitation, low risk for heat stress, severe risk for drought, lowest risk for flooding, moderate risk for extreme winds, low risk for wildfires, and severe risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Blaine**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 10 days per year exceeding 35°C (95°F) and 115 days per year below 0°C (32°F). The **Blaine** location may also experience roughly 189 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.01 meters of combined flooding. There is an annual wildfire probability of 0.06% predicted along with a 1.2 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.01 m	0.01 m (0%)	0.01 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	-9999 m	-9999 m (0%)	-9999 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	118 km/hr	118 km/hr (1%)	120 km/hr (2%)
	Average annual wind speed (in km/hr)	13 km/hr	13 km/hr (0%)	12 km/hr (-3%)
Heat	Annual number of days above 35°C	6 days	7 days (23%)	10 days (85%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	14 days	16 days (19%)	24 days (78%)
	Cooling Degree Days	609 degree days	664 degree days (9%)	787 degree days (29%)
Cold	Annual number of days below 0°C	125 days	122 days (-3%)	115 days (-8%)
	Heating Degree Days	3744 degree days	3617 degree days (-3%)	3371 degree days (-10%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	177 mm	181 mm (2%)	189 mm (7%)
	Total water equivalent precipitation (in mm) for the year	900 mm	900 mm (0%)	904 mm (0%)
Wildfire	Annual probability of wildfires (in %)	0.05%	0.06% (4%)	0.06% (9%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.5	0.5 (0%)	1.2 (119%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	1.4 days	1.38 days (-1%)	1.11 days (-21%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Blaine**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 1,017 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 2,594 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.02%	0.03%	0.02%	0.02%
Average Annual Damage (Contents)	0%	0%	0.01%	0.01%	0.02%	0.02%
Average Annual Damage (Inventory)	0%	0%	0.01%	0.01%	0.02%	0.02%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	792	1,017	2,374	2,594

For **heat**, the annual electricity consumption for cooling is expected to go from 11,980 kWh in 2020 to 15,374 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,236 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	11,980	15,374
Average Annual Loss (Cooling, USD)	963	1,236
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 3,166 in 2020 to USD 7,687 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 963 to USD 1,236 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 10,623,795 in 2020 and USD 22,610,896 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	3,166	7,687
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	963	1,236






Technical Cost of Insurance (USD)	29,701	66,429
Non-climate Risk Adjusted Forecasted Value (USD)	10,875,000	23,154,058
Total Climate Risk Value Adjustment (USD)	251,205	543,162
Climate Adjusted Value (USD)⁴	10,623,795	22,610,896

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 20-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 50-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 100-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 200-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 500-yr return period (m)	0.01	0.01	0.01	0.01
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	-9999	-9999	-9999	-9999

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	91	91	92	92
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	99	100	100	101
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	110	110	111	112
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	118	118	119	120

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	125	126	127	128
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	136	137	138	139
Average annual wind speed (km/hr)	13	13	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	111	113	115	117
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	129	132	134	137
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	156	159	162	166
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	177	181	185	189
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	200	205	209	214
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	233	238	244	249
Total water equivalent precipitation for the year (mm)	900	900	896	904

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	6	7	9	10

Days per year with temperature above 38°C	1	1	2	2
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	5	5	6
Number of days per year where WBGT above 32°C	14	16	21	24
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	2	3	5	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	9.2	9.8	10.1	10.7
Days per year with temperature below 0°C	125	122	118	115
Days per year with temperature below -10°C	52	48	45	42
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	29.2	24.8	22.4	19.6
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.3	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.05	0.06	0.06	0.06

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.5	0.5	0.9	1.2
Mean months per year where the rolling 6-month average SPEI is below -2	0.16	0.16	0.18	0.15

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	1.4	1.38	1.37	1.11
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	20	21	21	20

Nashua Location

26 Whipple Street Nashua NH US

(Coordinates: 42.7593, -71.4889)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Nashua** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 2,715 from **wind** events, a loss of USD 1,093 from a **wildfire** event, and a loss of USD 1,883 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	25
Current Hazard Score (2020)	25
Change Score (2020-2050)	41
Percentile Overall Score Relative to Country:	55
Percentile Overall Score Relative to Admin1 level:	1

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	25	18	48	Moderate
Heat	34	55	26	Low
Cold	79	-51	76	Elevated
Precipitation	38	57	36	Low
Wildfire	3	3	12	Lowest
Drought	44	44	62	Elevated
Hail	26	-57	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Nashua** has a percentile overall score of 1 relative to its admin level 1 for climate hazards and has a percentile overall score of 55 relative to its country. The location is at low risk for extreme precipitation, low risk for heat stress, elevated risk for drought, lowest risk for flooding, moderate risk for extreme winds, lowest risk for wildfires, and elevated risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Nashua**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 12 days per year exceeding 35°C (95°F) and 95 days per year below 0°C (32°F). The **Nashua** location may also experience roughly 210 mm of maximum daily precipitation at the 100-year return period by 2050 and 0 meters of combined flooding. There is an annual wildfire probability of 0.01% predicted along with a 0.2 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0 m	0 m (0%)	0 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	125 km/hr	126 km/hr (1%)	127 km/hr (2%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (0%)	12 km/hr (0%)
Heat	Annual number of days above 35°C	7 days	9 days (19%)	12 days (66%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	9 days	11 days (16%)	17 days (86%)
	Cooling Degree Days	546 degree days	592 degree days (8%)	700 degree days (28%)
Cold	Annual number of days below 0°C	106 days	103 days (-3%)	95 days (-11%)
	Heating Degree Days	3062 degree days	2966 degree days (-3%)	2745 degree days (-10%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	194 mm	199 mm (3%)	210 mm (8%)
	Total water equivalent precipitation (in mm) for the year	1127 mm	1127 mm (0%)	1145 mm (2%)
Wildfire	Annual probability of wildfires (in %)	0.01%	0.01% (0%)	0.01% (8%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.2	0.3 (11%)	0.2 (-7%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.05 days	0.05 days (0%)	0.02 days (-60%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Nashua**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 2,715 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 1,093 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.04%	0.04%	0.01%	0.01%
Average Annual Damage (Contents)	0%	0%	0.01%	0.02%	0.01%	0.01%
Average Annual Damage (Inventory)	0%	0%	0.01%	0.02%	0.01%	0.01%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	2,171	2,715	1,015	1,093

For **heat**, the annual electricity consumption for cooling is expected to go from 10,772 kWh in 2020 to 13,718 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,883 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	10,772	13,718
Average Annual Loss (Cooling, USD)	1,478	1,883
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 2,876 in 2020 to USD 7,315 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 310 in 2020 to USD 790 in 2050 and operative expenditures will go from USD 1,478 to USD 1,883 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 15,390,101 in 2020 and USD 32,758,490 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	2,876	7,315
Operational Revenue (OpRev, USD)	310	790
Operational Expenditures (OpEx, USD)	1,478	1,883






Technical Cost of Insurance (USD)	25,596	58,240
Non-climate Risk Adjusted Forecasted Value (USD)	15,611,000	33,237,517
Total Climate Risk Value Adjustment (USD)	220,899	479,028
Climate Adjusted Value (USD)⁴	15,390,101	32,758,490

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






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Lowest Exposure	
Low Exposure	
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SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

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Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0	0	0	0
Depth of flooding at the 50-yr return period (m)	0	0	0	0
Depth of flooding at the 100-yr return period (m)	0	0	0	0
Depth of flooding at the 200-yr return period (m)	0	0	0	0
Depth of flooding at the 500-yr return period (m)	0	0	0	0
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	90	91	91	92
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	99	100	101	101
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	111	112	113	114
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	125	126	126	127

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	143	145	145	146
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	170	172	171	173
Average annual wind speed (km/hr)	12	12	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	123	126	129	131
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	143	146	150	153
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	171	175	180	184
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	194	199	204	210
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	218	224	230	236
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	253	260	268	275
Total water equivalent precipitation for the year (mm)	1127	1127	1146	1145

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	7	9	11	12

Days per year with temperature above 38°C	2	2	2	3
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	6	6	7
Number of days per year where WBGT above 32°C	9	11	13	17
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	4	5
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	11.2	11.6	11.8	12.5
Days per year with temperature below 0°C	106	103	99	95
Days per year with temperature below -10°C	19	17	15	14
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	6.8	5	4.1	3.6
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.3	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.01	0.01	0.01	0.01

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.2	0.3	0.2	0.2
Mean months per year where the rolling 6-month average SPEI is below -2	0.24	0.25	0.27	0.24

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.05	0.05	0.01	0.02
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	5	5	6	5

Davis 602 Location

602 Cantrill Drive Davis CA US

(Coordinates: 38.5483, -121.7199)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Davis 602** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 56 from **wind** events, a loss of USD 95 from a **wildfire** event, and a loss of USD 3,749 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	21
Current Hazard Score (2020)	18
Change Score (2020-2050)	41
Percentile Overall Score Relative to Country:	49
Percentile Overall Score Relative to Admin1 level:	32

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	20	0	22	Low
Wind	19	0	14	Lowest
Heat	55	49	44	Moderate
Cold	29	-34	32	Low
Precipitation	18	54	27	Low
Wildfire	1	0	1	Lowest
Drought	43	37	57	Moderate
Hail	0	0	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Davis 602** has a percentile overall score of 32 relative to its admin level 1 for climate hazards and has a percentile overall score of 49 relative to its country. The location is at low risk for extreme precipitation, moderate risk for heat stress, moderate risk for drought, low risk for flooding, lowest risk for extreme winds, lowest risk for wildfires, and low risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Davis 602**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 72 days per year exceeding 35°C (95°F) and 2 days per year below 0°C (32°F). The **Davis 602** location may also experience roughly 160 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.06 meters of combined flooding. There is an annual wildfire probability of 0.01% predicted along with a 0.3 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.06 m	0.06 m (0%)	0.06 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	116 km/hr	116 km/hr (0%)	116 km/hr (0%)
	Average annual wind speed (in km/hr)	9 km/hr	9 km/hr (0%)	9 km/hr (0%)
Heat	Annual number of days above 35°C	59 days	63 days (7%)	72 days (22%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	15 days	18 days (20%)	26 days (70%)
	Cooling Degree Days	1127 degree days	1179 degree days (5%)	1332 degree days (18%)
Cold	Annual number of days below 0°C	3 days	3 days (-4%)	2 days (-29%)
	Heating Degree Days	1002 degree days	951 degree days (-5%)	847 degree days (-15%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	144 mm	149 mm (3%)	160 mm (11%)
	Total water equivalent precipitation (in mm) for the year	503 mm	491 mm (-2%)	507 mm (1%)
Wildfire	Annual probability of wildfires (in %)	0.01%	0.01% (0%)	0.01% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.2	0.2 (4%)	0.3 (10%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0 days	0 days (0%)	0 days (0%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Davis 602**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 56 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 95 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.01%	0.01%	0%	0%
Average Annual Damage (Contents)	0%	0%	0%	0%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	56	56	95	95

For **heat**, the annual electricity consumption for cooling is expected to go from 21,804 kWh in 2020 to 25,654 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 3,749 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 1% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	21,804	25,654
Average Annual Loss (Cooling, USD)	3,186	3,749
Average Annual Damage (Portion of Productivity Hours)	0%	1%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 151 in 2020 to USD 322 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 3,186 to USD 3,749 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 2,400,852 in 2020 and USD 5,134,776 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	151	322
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	3,186	3,749






Technical Cost of Insurance (USD)	3,201	6,816
Non-climate Risk Adjusted Forecasted Value (USD)	2,450,000	5,216,317
Total Climate Risk Value Adjustment (USD)	49,148	81,540
Climate Adjusted Value (USD)⁴	2,400,852	5,134,776

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter’s Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

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Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.06	0.06	0.06	0.06
Depth of flooding at the 20-yr return period (m)	0.06	0.06	0.06	0.06
Depth of flooding at the 50-yr return period (m)	0.06	0.06	0.06	0.06
Depth of flooding at the 100-yr return period (m)	0.06	0.06	0.06	0.06
Depth of flooding at the 200-yr return period (m)	0.06	0.06	0.06	0.06
Depth of flooding at the 500-yr return period (m)	0.06	0.06	0.06	0.06
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	88	87	87	87
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	96	96	96	96
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	108	108	108	108
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	116	116	116	116

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	124	124	124	124
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	136	136	136	136
Average annual wind speed (km/hr)	9	9	9	9

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	89	91	94	97
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	104	108	111	115
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	126	131	135	139
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	144	149	154	160
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	164	169	175	181
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	191	197	205	212
Total water equivalent precipitation for the year (mm)	503	491	499	507

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	59	63	67	72

Days per year with temperature above 38°C	24	27	30	33
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	6	6	7	8
Number of days per year where WBGT above 32°C	15	18	21	26
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	2	3	4	4
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	18.1	18.4	18.6	19.1
Days per year with temperature below 0°C	3	3	3	2
Days per year with temperature below -10°C	0	0	0	0
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	0	0	0	0
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	2.9	3.2	2.7	1.4

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.01	0.01	0.01	0.01

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.2	0.2	0.2	0.3
Mean months per year where the rolling 6-month average SPEI is below -2	0.11	0.11	0.12	0.13

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0	0	0	0
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	0	0	0	0

Davis 604 Location

604 Cantrill Drive Davis CA US

(Coordinates: 38.5484, -121.7195)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Davis 604** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 40 from **wind** events, a loss of USD 68 from a **wildfire** event, and a loss of USD 3,749 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	16
Current Hazard Score (2020)	9
Change Score (2020-2050)	41
Percentile Overall Score Relative to Country:	40
Percentile Overall Score Relative to Admin1 level:	27

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	19	0	14	Lowest
Heat	55	49	44	Moderate
Cold	29	-34	32	Low
Precipitation	18	54	27	Low
Wildfire	1	0	1	Lowest
Drought	43	37	57	Moderate
Hail	0	0	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Davis 604** has a percentile overall score of 27 relative to its admin level 1 for climate hazards and has a percentile overall score of 40 relative to its country. The location is at low risk for extreme precipitation, moderate risk for heat stress, moderate risk for drought, lowest risk for flooding, lowest risk for extreme winds, lowest risk for wildfires, and low risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Davis 604**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 72 days per year exceeding 35°C (95°F) and 2 days per year below 0°C (32°F). The **Davis 604** location may also experience roughly 160 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.02 meters of combined flooding. There is an annual wildfire probability of 0.01% predicted along with a 0.3 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.02 m	0.02 m (0%)	0.02 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	116 km/hr	116 km/hr (0%)	116 km/hr (0%)
	Average annual wind speed (in km/hr)	9 km/hr	9 km/hr (0%)	9 km/hr (0%)
Heat	Annual number of days above 35°C	59 days	63 days (7%)	72 days (22%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	15 days	18 days (20%)	26 days (70%)
	Cooling Degree Days	1127 degree days	1178 degree days (5%)	1332 degree days (18%)
Cold	Annual number of days below 0°C	3 days	3 days (-4%)	2 days (-29%)
	Heating Degree Days	1002 degree days	951 degree days (-5%)	847 degree days (-15%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	144 mm	149 mm (3%)	160 mm (11%)
	Total water equivalent precipitation (in mm) for the year	503 mm	492 mm (-2%)	508 mm (1%)
Wildfire	Annual probability of wildfires (in %)	0%	0.01% (20%)	0.01% (20%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.2	0.2 (4%)	0.3 (10%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0 days	0 days (0%)	0 days (0%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Davis 604**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 40 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 68 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.01%	0.01%	0%	0%
Average Annual Damage (Contents)	0%	0%	0%	0%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	40	40	56	68

For **heat**, the annual electricity consumption for cooling is expected to go from 21,804 kWh in 2020 to 25,654 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 3,749 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 1% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	21,804	25,654
Average Annual Loss (Cooling, USD)	3,186	3,749
Average Annual Damage (Portion of Productivity Hours)	0%	1%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 97 in 2020 to USD 230 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 3,186 to USD 3,749 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 1,708,840 in 2020 and USD 3,659,935 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	97	230
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	3,186	3,749






Technical Cost of Insurance (USD)	2,087	4,868
Non-climate Risk Adjusted Forecasted Value (USD)	1,750,000	3,725,940
Total Climate Risk Value Adjustment (USD)	41,160	66,005
Climate Adjusted Value (USD)⁴	1,708,840	3,659,935

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

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Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

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The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

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Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

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The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

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Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 20-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 50-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 100-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 200-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 500-yr return period (m)	0.02	0.02	0.02	0.02
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	88	87	87	87
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	96	96	96	96
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	108	108	108	107
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	116	116	116	116

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	124	124	124	124
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	136	136	136	136
Average annual wind speed (km/hr)	9	9	9	9

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	89	91	94	97
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	104	108	111	115
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	126	131	135	139
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	144	149	154	160
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	164	169	175	181
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	191	198	205	212
Total water equivalent precipitation for the year (mm)	503	492	499	508

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	59	63	67	72

Days per year with temperature above 38°C	24	27	30	33
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	6	6	7	8
Number of days per year where WBGT above 32°C	15	18	21	26
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	2	3	4	4
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	18.1	18.4	18.6	19.1
Days per year with temperature below 0°C	3	3	3	2
Days per year with temperature below -10°C	0	0	0	0
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	0	0	0	0
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	2.9	3.2	2.7	1.4

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0	0.01	0.01	0.01

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.2	0.2	0.2	0.3
Mean months per year where the rolling 6-month average SPEI is below -2	0.11	0.11	0.12	0.13

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0	0	0	0
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	0	0	0	0

Kettering Location

2941 College Drive Kettering OH US

(Coordinates: 39.7246, -84.1186)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Kettering** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 14 from **wind** events, a loss of USD 3 from a **wildfire** event, and a loss of USD 1,296 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	20
Current Hazard Score (2020)	39
Change Score (2020-2050)	17
Percentile Overall Score Relative to Country:	47
Percentile Overall Score Relative to Admin1 level:	87

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	29	0	31	Low
Wind	18	-3	10	Lowest
Heat	42	61	43	Moderate
Cold	68	-49	66	Elevated
Precipitation	32	54	32	Low
Wildfire	0	0	0	Lowest
Drought	7	18	29	Low
Hail	56	-58	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Kettering** has a percentile overall score of 87 relative to its admin level 1 for climate hazards and has a percentile overall score of 47 relative to its country. The location is at low risk for extreme precipitation, moderate risk for heat stress, low risk for drought, low risk for flooding, lowest risk for extreme winds, lowest risk for wildfires, and elevated risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Kettering**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 20 days per year exceeding 35°C (95°F) and 72 days per year below 0°C (32°F). The **Kettering** location may also experience roughly 195 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.13 meters of combined flooding. There is an annual wildfire probability of 0% predicted along with a 0 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.13 m	0.13 m (0%)	0.13 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	-9999 m	-9999 m (0%)	-9999 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	114 km/hr	113 km/hr (0%)	113 km/hr (-1%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (-3%)	11 km/hr (-6%)
Heat	Annual number of days above 35°C	12 days	15 days (18%)	20 days (61%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	22 days	26 days (18%)	37 days (69%)
	Cooling Degree Days	784 degree days	848 degree days (8%)	981 degree days (25%)
Cold	Annual number of days below 0°C	82 days	78 days (-5%)	72 days (-13%)
	Heating Degree Days	2487 degree days	2391 degree days (-4%)	2216 degree days (-11%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	179 mm	184 mm (3%)	195 mm (9%)
	Total water equivalent precipitation (in mm) for the year	1076 mm	1054 mm (-2%)	1089 mm (1%)
Wildfire	Annual probability of wildfires (in %)	0%	0% (0%)	0% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0	0 (6%)	0 (-9%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.3 days	0.28 days (-7%)	0.15 days (-50%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Kettering**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 14 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 3 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0.04%	0.04%	0.01%	0.01%	0%	0%
Average Annual Damage (Contents)	0%	0%	0%	0%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	15	14	3	3

For **heat**, the annual electricity consumption for cooling is expected to go from 15,317 kWh in 2020 to 19,051 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,296 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 1% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	15,317	19,051
Average Annual Loss (Cooling, USD)	1,042	1,296
Average Annual Damage (Portion of Productivity Hours)	0%	1%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 18 in 2020 to USD 36 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 1,042 to USD 1,296 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 490,344 in 2020 and USD 1,050,875 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	18	36
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	1,042	1,296





Technical Cost of Insurance (USD)	250	529
Non-climate Risk Adjusted Forecasted Value (USD)	500,000	1,064,554
Total Climate Risk Value Adjustment (USD)	9,656	13,680
Climate Adjusted Value (USD)⁴	490,344	1,050,875

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.12	0.12	0.12	0.12
Depth of flooding at the 20-yr return period (m)	0.12	0.12	0.12	0.12
Depth of flooding at the 50-yr return period (m)	0.12	0.12	0.12	0.12
Depth of flooding at the 100-yr return period (m)	0.13	0.13	0.13	0.13
Depth of flooding at the 200-yr return period (m)	0.13	0.13	0.13	0.13
Depth of flooding at the 500-yr return period (m)	0.13	0.13	0.13	0.13
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	-9999	-9999	-9999	-9999

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	86	86	86	86
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	95	94	94	94
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	106	105	105	105
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	114	113	113	113

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	122	122	121	121
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	133	132	132	132
Average annual wind speed (km/hr)	12	12	12	11

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	113	116	119	122
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	132	135	139	143
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	158	162	167	171
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	179	184	189	195
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	202	207	213	219
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	234	241	248	255
Total water equivalent precipitation for the year (mm)	1076	1054	1072	1089

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	12	15	17	20

Days per year with temperature above 38°C	3	3	4	5
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	5	6	7
Number of days per year where WBGT above 32°C	22	26	32	37
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	2	4	5	7
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	13.4	13.9	14.1	14.6
Days per year with temperature below 0°C	82	78	74	72
Days per year with temperature below -10°C	14	13	12	11
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	2.6	1.6	1.5	1.1
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.3	0.1	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0	0	0	0

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0	0	0	0
Mean months per year where the rolling 6-month average SPEI is below -2	0.21	0.26	0.27	0.2

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.3	0.28	0.23	0.15
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	9	9	9	9

Dayton Location

1450 Wilmington Ave. Dayton OH US

(Coordinates: 39.722, -84.1497)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Dayton** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 0 from **wind** events, a loss of USD 0 from a **wildfire** event, and a loss of USD 1,297 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	10
Current Hazard Score (2020)	18
Change Score (2020-2050)	17
Percentile Overall Score Relative to Country:	28
Percentile Overall Score Relative to Admin1 level:	29

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	18	-3	10	Lowest
Heat	42	61	42	Moderate
Cold	68	-49	66	Elevated
Precipitation	32	55	33	Low
Wildfire	0	0	0	Lowest
Drought	7	18	29	Low
Hail	57	-59	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Dayton** has a percentile overall score of 29 relative to its admin level 1 for climate hazards and has a percentile overall score of 28 relative to its country. The location is at low risk for extreme precipitation, moderate risk for heat stress, low risk for drought, lowest risk for flooding, lowest risk for extreme winds, lowest risk for wildfires, and elevated risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Dayton**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 20 days per year exceeding 35°C (95°F) and 71 days per year below 0°C (32°F). The **Dayton** location may also experience roughly 196 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.01 meters of combined flooding. There is an annual wildfire probability of 0% predicted along with a 0 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.01 m	0.01 m (0%)	0.01 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	-9999 m	-9999 m (0%)	-9999 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	114 km/hr	114 km/hr (0%)	113 km/hr (-1%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (-3%)	11 km/hr (-6%)
Heat	Annual number of days above 35°C	12 days	15 days (18%)	20 days (61%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	22 days	26 days (18%)	37 days (69%)
	Cooling Degree Days	784 degree days	848 degree days (8%)	982 degree days (25%)
Cold	Annual number of days below 0°C	82 days	78 days (-5%)	71 days (-13%)
	Heating Degree Days	2486 degree days	2389 degree days (-4%)	2214 degree days (-11%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	180 mm	185 mm (3%)	196 mm (9%)
	Total water equivalent precipitation (in mm) for the year	1087 mm	1064 mm (-2%)	1100 mm (1%)
Wildfire	Annual probability of wildfires (in %)	0%	0% (0%)	0% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0	0 (6%)	0 (-9%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.3 days	0.28 days (-7%)	0.15 days (-50%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Dayton**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 0 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 0 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.01%	0.01%	0%	0%
Average Annual Damage (Contents)	0%	0%	0%	0%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	0	0	0	0

For **heat**, the annual electricity consumption for cooling is expected to go from 15,317 kWh in 2020 to 19,070 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,297 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 1% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	15,317	19,070
Average Annual Loss (Cooling, USD)	1,042	1,297
Average Annual Damage (Portion of Productivity Hours)	0%	1%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 0 in 2020 to USD 0 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 1,042 to USD 1,297 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 0 in 2020 and USD 0 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	0	0
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	1,042	1,297






Technical Cost of Insurance (USD)	0	0
Non-climate Risk Adjusted Forecasted Value (USD)	1,000	2,129
Total Climate Risk Value Adjustment (USD)	1,000	2,129
Climate Adjusted Value (USD)⁴	0	0

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 20-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 50-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 100-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 200-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 500-yr return period (m)	0.01	0.01	0.01	0.01
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	-9999	-9999	-9999	-9999

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	86	86	86	86
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	95	95	94	94
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	106	106	105	105
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	114	114	113	113

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	122	122	121	121
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	133	132	132	132
Average annual wind speed (km/hr)	12	12	12	11

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	114	117	120	123
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	132	136	140	143
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	159	163	168	172
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	180	185	191	196
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	203	209	215	221
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	236	243	250	257
Total water equivalent precipitation for the year (mm)	1087	1064	1082	1100

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	12	15	17	20

Days per year with temperature above 38°C	3	3	4	5
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	5	6	7
Number of days per year where WBGT above 32°C	22	26	33	37
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	2	4	5	7
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	13.4	13.9	14.1	14.6
Days per year with temperature below 0°C	82	78	74	71
Days per year with temperature below -10°C	14	13	12	11
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	2.5	1.6	1.5	1.1
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.3	0.1	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0	0	0	0

Table 12 | Drought Peril Metrics

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Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0	0	0	0
Mean months per year where the rolling 6-month average SPEI is below -2	0.21	0.26	0.27	0.19

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.3	0.28	0.24	0.15
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	9	9	9	9

Switzerland Location

Route de Chardonne 4 Puidoux VD CH

(Coordinates: 46.4912, 6.7677)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Switzerland** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 171,113 from **flood** events, a loss of USD 5,955 from **wind** events, a loss of USD 386 from a **wildfire** event, and a loss of USD 676 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	15
Current Hazard Score (2020)	36
Change Score (2020-2050)	11
Percentile Overall Score Relative to Country:	82
Percentile Overall Score Relative to Admin1 level:	94

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	52	0	53	Moderate
Wind	26	-2	22	Low
Heat	7	65	14	Lowest
Cold	70	-58	67	Elevated
Precipitation	20	32	19	Lowest
Wildfire	2	0	3	Lowest
Drought	17	38	47	Moderate
Hail	38	-57	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Switzerland** has a percentile overall score of 94 relative to its admin level 1 for climate hazards and has a percentile overall score of 82 relative to its country. The location is at lowest risk for extreme precipitation, lowest risk for heat stress, moderate risk for drought, moderate risk for flooding, low risk for extreme winds, lowest risk for wildfires, and elevated risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Switzerland**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 1 days per year exceeding 35°C (95°F) and 50 days per year below 0°C (32°F). The **Switzerland** location may also experience roughly 158 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.65 meters of combined flooding. There is an annual wildfire probability of 0.01% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.65 m	0.65 m (0%)	0.65 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	126 km/hr	126 km/hr (0%)	126 km/hr (0%)
	Average annual wind speed (in km/hr)	6 km/hr	6 km/hr (0%)	6 km/hr (-5%)
Heat	Annual number of days above 35°C	1 days	1 days (41%)	1 days (169%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	0 days	1 days (47%)	1 days (172%)
	Cooling Degree Days	141 degree days	167 degree days (18%)	231 degree days (64%)
Cold	Annual number of days below 0°C	63 days	57 days (-8%)	50 days (-20%)
	Heating Degree Days	3033 degree days	2950 degree days (-3%)	2764 degree days (-9%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	151 mm	153 mm (1%)	158 mm (5%)
	Total water equivalent precipitation (in mm) for the year	1387 mm	1359 mm (-2%)	1351 mm (-3%)
Wildfire	Annual probability of wildfires (in %)	0.01%	0.01% (0%)	0.01% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (9%)	0.1 (-2%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.07 days	0.07 days (0%)	0.08 days (14%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Switzerland**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 3 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 171,113 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 5,955 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 386 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0.95%	0.95%	0.05%	0.05%	0%	0%
Average Annual Damage (Contents)	1.06%	1.06%	0.02%	0.02%	0%	0%
Average Annual Damage (Inventory)	1.62%	1.62%	0.02%	0.02%	0%	0%

Average Annual Downtime	3 days	3 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	171,113	171,113	6,011	5,955	386	386

For **heat**, the annual electricity consumption for cooling is expected to go from 2,885 kWh in 2020 to 4,665 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 676 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	2,885	4,665
Average Annual Loss (Cooling, USD)	418	676
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 177,512 in 2020 to USD 1,093,341 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 418 to USD 676 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 14,821,367 in 2020 and USD 91,187,618 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	177,512	1,093,341
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	418	676






Technical Cost of Insurance (USD)	239,659	1,476,338
Non-climate Risk Adjusted Forecasted Value (USD)	17,050,000	105,048,553
Total Climate Risk Value Adjustment (USD)	2,228,633	13,860,935
Climate Adjusted Value (USD)⁴	14,821,367	91,187,618

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.65	0.65	0.65	0.65
Depth of flooding at the 20-yr return period (m)	0.65	0.65	0.65	0.65
Depth of flooding at the 50-yr return period (m)	0.65	0.65	0.65	0.65
Depth of flooding at the 100-yr return period (m)	0.65	0.65	0.65	0.65
Depth of flooding at the 200-yr return period (m)	0.65	0.65	0.65	0.65
Depth of flooding at the 500-yr return period (m)	0.65	0.65	0.65	0.65
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	96	96	96	96
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	105	105	105	105
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	117	117	117	117
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	126	126	126	126

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	135	135	135	135
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	146	146	146	146
Average annual wind speed (km/hr)	6	6	6	6

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	98	99	100	102
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	113	114	116	118
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	134	136	138	140
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	151	153	156	158
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	169	172	175	178
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	195	199	202	206
Total water equivalent precipitation for the year (mm)	1387	1359	1358	1351

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	1	1	1	1

Days per year with temperature above 38°C	0	0	0	0
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	6	7	8	10
Number of days per year where WBGT above 32°C	0	1	1	1
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	2	4	4	6
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	11.2	11.4	11.6	12
Days per year with temperature below 0°C	63	57	56	50
Days per year with temperature below -10°C	1	1	1	1
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	6.9	5.5	5.1	4.7
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	2.9	2.2	2.2	1.8

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.01	0.01	0.01	0.01

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.41	0.47	0.51	0.52

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.07	0.07	0.07	0.08
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	3	4	4	4

Israel Building 1 Location

9 Hahadas St. Or Akiva HA IS

(Coordinates: 32.5153, 34.9208)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Israel Building 1** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 3,995 from **wind** events, a loss of USD 0 from a **wildfire** event, and a loss of USD 4,708 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	28
Current Hazard Score (2020)	19
Change Score (2020-2050)	52
Percentile Overall Score Relative to Country:	43
Percentile Overall Score Relative to Admin1 level:	9

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	32	-7	24	Low
Heat	54	69	70	Elevated
Cold	13	-15	17	Lowest
Precipitation	35	22	21	Low
Wildfire	0	0	0	Lowest
Drought	90	5	81	Severe
Hail	5	52	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Israel Building 1** has a percentile overall score of 9 relative to its admin level 1 for climate hazards and has a percentile overall score of 43 relative to its country. The location is at low risk for extreme precipitation, elevated risk for heat stress, severe risk for drought, lowest risk for flooding, low risk for extreme winds, lowest risk for wildfires, and lowest risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Israel Building 1**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 30 days per year exceeding 35°C (95°F) and 0 days per year below 0°C (32°F). The **Israel Building 1** location may also experience roughly 193 mm of maximum daily precipitation at the 100-year return period by 2050 and 0 meters of combined flooding. There is an annual wildfire probability of 0% predicted along with a 4.7 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0 m	0 m (0%)	0 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	133 km/hr	133 km/hr (0%)	133 km/hr (-1%)
	Average annual wind speed (in km/hr)	11 km/hr	11 km/hr (0%)	11 km/hr (0%)
Heat	Annual number of days above 35°C	15 days	19 days (25%)	30 days (99%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	54 days	62 days (15%)	82 days (54%)
	Cooling Degree Days	1635 degree days	1711 degree days (5%)	1881 degree days (15%)
Cold	Annual number of days below 0°C	0 days	0 days (0%)	0 days (-100%)
	Heating Degree Days	424 degree days	392 degree days (-8%)	331 degree days (-22%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	188 mm	189 mm (1%)	193 mm (3%)
	Total water equivalent precipitation (in mm) for the year	327 mm	327 mm (0%)	316 mm (-3%)
Wildfire	Annual probability of wildfires (in %)	0%	0% (0%)	0% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	2.7	2.8 (5%)	4.7 (77%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0 days	0.02 days (0%)	0.01 days (0%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Israel Building 1**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 3,995 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 0 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.06%	0.06%	0%	0%
Average Annual Damage (Contents)	0%	0%	0.02%	0.02%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0.02%	0.02%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	4,265	3,995	0	0

For **heat**, the annual electricity consumption for cooling is expected to go from 31,316 kWh in 2020 to 35,892 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 4,708 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 1% in 2020 to 1% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	31,316	35,892
Average Annual Loss (Cooling, USD)	4,108	4,708
Average Annual Damage (Portion of Productivity Hours)	1%	1%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 4,265 in 2020 to USD 1,585 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 4,108 to USD 4,708 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 13,117,050 in 2020 and USD 5,189,540 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	4,265	1,585
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	4,108	4,708






Technical Cost of Insurance (USD)	6,579	2,431
Non-climate Risk Adjusted Forecasted Value (USD)	13,166,039	5,222,522
Total Climate Risk Value Adjustment (USD)	48,989	32,982
Climate Adjusted Value (USD)⁴	13,117,050	5,189,540

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0	0	0	0
Depth of flooding at the 50-yr return period (m)	0	0	0	0
Depth of flooding at the 100-yr return period (m)	0	0	0	0
Depth of flooding at the 200-yr return period (m)	0	0	0	0
Depth of flooding at the 500-yr return period (m)	0	0	0	0
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	100	99	99	99
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	110	110	109	109
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	123	123	123	123
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	133	133	133	133

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	144	143	143	143
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	157	156	156	156
Average annual wind speed (km/hr)	11	11	11	11

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	112	113	114	114
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	134	134	135	136
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	163	165	166	167
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	188	189	191	193
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	214	216	218	220
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	251	253	256	258
Total water equivalent precipitation for the year (mm)	327	327	322	316

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	15	19	24	30

Days per year with temperature above 38°C	1	2	2	3
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	6	7	8	9
Number of days per year where WBGT above 32°C	54	62	72	82
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	5	7	10	13
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	1	1
Average annual temperature (°C)	21.6	21.9	22.1	22.5
Days per year with temperature below 0°C	0	0	0	0
Days per year with temperature below -10°C	0	0	0	0
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	0	0	0	0
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	1.4	0.6	0.3	0.4

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0	0	0	0

Table 12 | Drought Peril Metrics

Confidential ClimateScore Global Data provided by © 2025, Jupiter Intelligence Inc.

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	2.7	2.8	3.8	4.7
Mean months per year where the rolling 6-month average SPEI is below -2	0.49	0.58	0.72	0.9

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0	0.02	0.03	0.01
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	25	25	24	25

Israel Building 2 Location

9 Hahadas St. Or Akiva HA IS

(Coordinates: 32.5153, 34.9208)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **Israel Building 2** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 4,153 from **wind** events, a loss of USD 0 from a **wildfire** event, and a loss of USD 4,708 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	28
Current Hazard Score (2020)	19
Change Score (2020-2050)	52
Percentile Overall Score Relative to Country:	43
Percentile Overall Score Relative to Admin1 level:	9

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	32	-7	24	Low
Heat	54	69	70	Elevated
Cold	13	-15	17	Lowest
Precipitation	35	22	21	Low
Wildfire	0	0	0	Lowest
Drought	90	5	81	Severe
Hail	5	52	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **Israel Building 2** has a percentile overall score of 9 relative to its admin level 1 for climate hazards and has a percentile overall score of 43 relative to its country. The location is at low risk for extreme precipitation, elevated risk for heat stress, severe risk for drought, lowest risk for flooding, low risk for extreme winds, lowest risk for wildfires, and lowest risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **Israel Building 2**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 30 days per year exceeding 35°C (95°F) and 0 days per year below 0°C (32°F). The **Israel Building 2** location may also experience roughly 193 mm of maximum daily precipitation at the 100-year return period by 2050 and 0 meters of combined flooding. There is an annual wildfire probability of 0% predicted along with a 4.7 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0 m	0 m (0%)	0 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	133 km/hr	133 km/hr (0%)	133 km/hr (-1%)
	Average annual wind speed (in km/hr)	11 km/hr	11 km/hr (0%)	11 km/hr (0%)
Heat	Annual number of days above 35°C	15 days	19 days (25%)	30 days (99%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	54 days	62 days (15%)	82 days (54%)
	Cooling Degree Days	1635 degree days	1711 degree days (5%)	1881 degree days (15%)
Cold	Annual number of days below 0°C	0 days	0 days (0%)	0 days (-100%)
	Heating Degree Days	424 degree days	392 degree days (-8%)	331 degree days (-22%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	188 mm	189 mm (1%)	193 mm (3%)
	Total water equivalent precipitation (in mm) for the year	327 mm	327 mm (0%)	316 mm (-3%)
Wildfire	Annual probability of wildfires (in %)	0%	0% (0%)	0% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	2.7	2.8 (5%)	4.7 (77%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0 days	0.02 days (0%)	0.01 days (0%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **Israel Building 2**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 4,153 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 0 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.06%	0.06%	0%	0%
Average Annual Damage (Contents)	0%	0%	0.02%	0.02%	0%	0%
Average Annual Damage (Inventory)	0%	0%	0.02%	0.02%	0%	0%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	4,435	4,153	0	0

For **heat**, the annual electricity consumption for cooling is expected to go from 31,316 kWh in 2020 to 35,892 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 4,708 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 1% in 2020 to 1% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	31,316	35,892
Average Annual Loss (Cooling, USD)	4,108	4,708
Average Annual Damage (Portion of Productivity Hours)	1%	1%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 3,418 in 2020 to USD 1,273 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 1,016 in 2020 to USD 374 in 2050 and operative expenditures will go from USD 4,108 to USD 4,708 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 13,952,491 in 2020 and USD 5,520,898 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	3,418	1,273
Operational Revenue (OpRev, USD)	1,016	374
Operational Expenditures (OpEx, USD)	4,108	4,708






Technical Cost of Insurance (USD)	6,251	2,302
Non-climate Risk Adjusted Forecasted Value (USD)	14,000,000	5,553,326
Total Climate Risk Value Adjustment (USD)	47,509	32,428
Climate Adjusted Value (USD)⁴	13,952,491	5,520,898

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






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This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

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Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0	0	0	0
Depth of flooding at the 50-yr return period (m)	0	0	0	0
Depth of flooding at the 100-yr return period (m)	0	0	0	0
Depth of flooding at the 200-yr return period (m)	0	0	0	0
Depth of flooding at the 500-yr return period (m)	0	0	0	0
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	100	99	99	99
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	110	110	109	109
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	123	123	123	123
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	133	133	133	133

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	144	143	143	143
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	157	156	156	156
Average annual wind speed (km/hr)	11	11	11	11

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	112	113	114	114
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	134	134	135	136
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	163	165	166	167
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	188	189	191	193
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	214	216	218	220
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	251	253	256	258
Total water equivalent precipitation for the year (mm)	327	327	322	316

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	15	19	24	30

Days per year with temperature above 38°C	1	2	2	3
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	6	7	8	9
Number of days per year where WBGT above 32°C	54	62	72	82
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	5	7	10	13
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	1	1
Average annual temperature (°C)	21.6	21.9	22.1	22.5
Days per year with temperature below 0°C	0	0	0	0
Days per year with temperature below -10°C	0	0	0	0
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	0	0	0	0
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	1.4	0.6	0.3	0.4

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0	0	0	0

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	2.7	2.8	3.8	4.7
Mean months per year where the rolling 6-month average SPEI is below -2	0.49	0.58	0.72	0.9

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0	0.02	0.03	0.01
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	25	25	24	25

New Hartford Location

4354 Middle Settlement Road New Hartford NY US

(Coordinates: 43.0824, -75.3269)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **New Hartford** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 4,529 from **wind** events, a loss of USD 2,383 from a **wildfire** event, and a loss of USD 889 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	31
Current Hazard Score (2020)	11
Change Score (2020-2050)	65
Percentile Overall Score Relative to Country:	64
Percentile Overall Score Relative to Admin1 level:	45

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	20	32	59	Moderate
Heat	24	68	30	Low
Cold	83	-42	82	Severe
Precipitation	20	42	23	Low
Wildfire	4	0	6	Lowest
Drought	19	42	50	Moderate
Hail	22	-41	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **New Hartford** has a percentile overall score of 45 relative to its admin level 1 for climate hazards and has a percentile overall score of 64 relative to its country. The location is at low risk for extreme precipitation, low risk for heat stress, moderate risk for drought, lowest risk for flooding, moderate risk for extreme winds, lowest risk for wildfires, and severe risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **New Hartford**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 6 days per year exceeding 35°C (95°F) and 110 days per year below 0°C (32°F). The **New Hartford** location may also experience roughly 161 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.01 meters of combined flooding. There is an annual wildfire probability of 0.02% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.01 m	0.01 m (0%)	0.01 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	119 km/hr	120 km/hr (1%)	123 km/hr (3%)
	Average annual wind speed (in km/hr)	11 km/hr	11 km/hr (0%)	11 km/hr (0%)
Heat	Annual number of days above 35°C	3 days	4 days (24%)	6 days (88%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	5 days	6 days (24%)	12 days (129%)
	Cooling Degree Days	360 degree days	404 degree days (12%)	505 degree days (40%)
Cold	Annual number of days below 0°C	119 days	116 days (-2%)	110 days (-8%)
	Heating Degree Days	3455 degree days	3345 degree days (-3%)	3096 degree days (-10%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	151 mm	154 mm (2%)	161 mm (7%)
	Total water equivalent precipitation (in mm) for the year	1391 mm	1384 mm (-1%)	1407 mm (1%)
Wildfire	Annual probability of wildfires (in %)	0.02%	0.02% (0%)	0.02% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (5%)	0.1 (-3%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.05 days	0.05 days (0%)	0.02 days (-60%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **New Hartford**, classified as **Metal foundry** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 4,529 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 2,383 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.02%	0.03%	0.01%	0.01%
Average Annual Damage (Contents)	0%	0%	0.01%	0.01%	0.01%	0.01%
Average Annual Damage (Inventory)	0%	0%	0.01%	0.01%	0.01%	0.01%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	3,303	4,529	2,383	2,383

For **heat**, the annual electricity consumption for cooling is expected to go from 10,269 kWh in 2020 to 14,274 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 889 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	10,269	14,274
Average Annual Loss (Cooling, USD)	640	889
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 4,310 in 2020 to USD 5,990 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 1,376 in 2020 to USD 1,854 in 2050 and operative expenditures will go from USD 640 to USD 889 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 22,944,013 in 2020 and USD 26,033,692 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	4,310	5,990
Operational Revenue (OpRev, USD)	1,376	1,854
Operational Expenditures (OpEx, USD)	640	889





Technical Cost of Insurance (USD)	30,343	35,375
Non-climate Risk Adjusted Forecasted Value (USD)	23,200,000	26,330,648
Total Climate Risk Value Adjustment (USD)	255,987	296,955
Climate Adjusted Value (USD)⁴	22,944,013	26,033,692

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

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Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

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Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

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Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 50-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 100-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 200-yr return period (m)	0.01	0.01	0.01	0.01
Depth of flooding at the 500-yr return period (m)	0.01	0.01	0.01	0.01
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	90	91	91	92
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	99	100	100	101
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	110	112	112	114
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	119	120	122	123

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	128	129	130	132
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	139	141	142	144
Average annual wind speed (km/hr)	11	11	11	11

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	96	98	100	102
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	112	114	116	119
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	133	136	139	142
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	151	154	157	161
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	169	173	177	181
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	196	200	205	209
Total water equivalent precipitation for the year (mm)	1391	1384	1388	1407

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	3	4	5	6

Days per year with temperature above 38°C	1	1	1	1
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	6	6	7
Number of days per year where WBGT above 32°C	5	6	9	12
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	3	5
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	9.7	10.1	10.5	11
Days per year with temperature below 0°C	119	116	112	110
Days per year with temperature below -10°C	31	29	26	24
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	16	12.2	10.6	9
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.4	0.1	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.02	0.02	0.02	0.02

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.24	0.29	0.27	0.29

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.05	0.05	0.01	0.02
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	5	5	5	5

New Boston Location

326 Chestnut Hill Road New Boston NH US

(Coordinates: 42.949, -71.6198)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **New Boston** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 84 from **wind** events, a loss of USD 302 from a **wildfire** event, and a loss of USD 1,715 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	24
Current Hazard Score (2020)	23
Change Score (2020-2050)	41
Percentile Overall Score Relative to Country:	54
Percentile Overall Score Relative to Admin1 level:	1

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	0	0	0	Lowest
Wind	24	9	33	Low
Heat	28	61	26	Low
Cold	81	-45	80	Severe
Precipitation	37	55	35	Low
Wildfire	8	2	19	Lowest
Drought	44	44	62	Elevated
Hail	26	-55	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **New Boston** has a percentile overall score of 1 relative to its admin level 1 for climate hazards and has a percentile overall score of 54 relative to its country. The location is at low risk for extreme precipitation, low risk for heat stress, elevated risk for drought, lowest risk for flooding, low risk for extreme winds, lowest risk for wildfires, and severe risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **New Boston**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 6 days per year exceeding 35°C (95°F) and 104 days per year below 0°C (32°F). The **New Boston** location may also experience roughly 208 mm of maximum daily precipitation at the 100-year return period by 2050 and 0 meters of combined flooding. There is an annual wildfire probability of 0.04% predicted along with a 0.2 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0 m	0 m (0%)	0 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	123 km/hr	124 km/hr (0%)	124 km/hr (1%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (0%)	12 km/hr (0%)
Heat	Annual number of days above 35°C	3 days	4 days (23%)	6 days (83%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	7 days	8 days (18%)	14 days (97%)
	Cooling Degree Days	487 degree days	532 degree days (9%)	636 degree days (31%)
Cold	Annual number of days below 0°C	114 days	111 days (-2%)	104 days (-9%)
	Heating Degree Days	3255 degree days	3156 degree days (-3%)	2926 degree days (-10%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	192 mm	197 mm (3%)	208 mm (8%)
	Total water equivalent precipitation (in mm) for the year	1162 mm	1165 mm (0%)	1181 mm (2%)
Wildfire	Annual probability of wildfires (in %)	0.04%	0.04% (0%)	0.04% (3%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.2	0.3 (11%)	0.2 (-7%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.05 days	0.05 days (0%)	0.02 days (-60%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **New Boston**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 84 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 302 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.02%	0.03%	0.03%	0.03%
Average Annual Damage (Contents)	0%	0%	0.01%	0.01%	0.03%	0.03%
Average Annual Damage (Inventory)	0%	0%	0.01%	0.01%	0.03%	0.03%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	76	84	295	302

For **heat**, the annual electricity consumption for cooling is expected to go from 9,638 kWh in 2020 to 12,496 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,715 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 0% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	9,638	12,496
Average Annual Loss (Cooling, USD)	1,323	1,715
Average Annual Damage (Portion of Productivity Hours)	0%	0%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 371 in 2020 to USD 823 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 1,323 to USD 1,715 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 1,057,878 in 2020 and USD 2,260,839 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	371	823
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	1,323	1,715





Technical Cost of Insurance (USD)	3,976	8,600
Non-climate Risk Adjusted Forecasted Value (USD)	1,100,000	2,342,020
Total Climate Risk Value Adjustment (USD)	42,122	81,181
Climate Adjusted Value (USD)⁴	1,057,878	2,260,839

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0	0	0	0
Depth of flooding at the 20-yr return period (m)	0	0	0	0
Depth of flooding at the 50-yr return period (m)	0	0	0	0
Depth of flooding at the 100-yr return period (m)	0	0	0	0
Depth of flooding at the 200-yr return period (m)	0	0	0	0
Depth of flooding at the 500-yr return period (m)	0	0	0	0
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	89	90	91	91
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	98	99	100	101
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	110	111	112	114
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	123	124	124	124

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	142	142	142	143
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	168	168	169	169
Average annual wind speed (km/hr)	12	12	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	123	126	129	131
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	143	146	150	153
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	170	174	179	183
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	192	197	202	208
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	215	221	228	234
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	249	256	264	271
Total water equivalent precipitation for the year (mm)	1162	1165	1184	1181

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	3	4	5	6

Days per year with temperature above 38°C	1	1	1	1
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	6	6	7
Number of days per year where WBGT above 32°C	7	8	11	14
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	3	5
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	10.6	10.9	11.2	11.8
Days per year with temperature below 0°C	114	111	107	104
Days per year with temperature below -10°C	25	23	20	18
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	10.2	7.7	6.3	5.7
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.3	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.04	0.04	0.04	0.04

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.2	0.3	0.2	0.2
Mean months per year where the rolling 6-month average SPEI is below -2	0.23	0.24	0.27	0.25

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.05	0.05	0.01	0.02
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	5	5	5	5

New Freedom Bldg #1 Location

302 Pleasant Ave. New Freedom PA US

(Coordinates: 39.4464, -76.4168)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **New Freedom Bldg #1** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 70 from **wind** events, a loss of USD 292 from a **wildfire** event, and a loss of USD 1,744 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	25
Current Hazard Score (2020)	35
Change Score (2020-2050)	31
Percentile Overall Score Relative to Country:	55
Percentile Overall Score Relative to Admin1 level:	55

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	10	0	9	Lowest
Wind	19	2	17	Lowest
Heat	42	60	42	Moderate
Cold	59	-46	58	Moderate
Precipitation	58	57	54	Moderate
Wildfire	5	0	9	Lowest
Drought	25	54	57	Moderate
Hail	48	-69	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **New Freedom Bldg #1** has a percentile overall score of 55 relative to its admin level 1 for climate hazards and has a percentile overall score of 55 relative to its country. The location is at moderate risk for extreme precipitation, moderate risk for heat stress, moderate risk for drought, lowest risk for flooding, lowest risk for extreme winds, lowest risk for wildfires, and moderate risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **New Freedom Bldg #1**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 17 days per year exceeding 35°C (95°F) and 44 days per year below 0°C (32°F). The **New Freedom Bldg #1** location may also experience roughly 261 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.03 meters of combined flooding. There is an annual wildfire probability of 0.02% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.03 m	0.03 m (0%)	0.03 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	116 km/hr	116 km/hr (0%)	116 km/hr (0%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (0%)	12 km/hr (-2%)
Heat	Annual number of days above 35°C	10 days	12 days (20%)	17 days (71%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	26 days	29 days (12%)	42 days (59%)
	Cooling Degree Days	874 degree days	937 degree days (7%)	1061 degree days (21%)
Cold	Annual number of days below 0°C	55 days	50 days (-9%)	44 days (-21%)
	Heating Degree Days	2164 degree days	2081 degree days (-4%)	1906 degree days (-12%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	245 mm	250 mm (2%)	261 mm (7%)
	Total water equivalent precipitation (in mm) for the year	1130 mm	1137 mm (1%)	1167 mm (3%)
Wildfire	Annual probability of wildfires (in %)	0.02%	0.02% (0%)	0.02% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (4%)	0.1 (6%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.2 days	0.15 days (-25%)	0.06 days (-70%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **New Freedom Bldg #1**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 70 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 292 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.01%	0.01%	0.01%	0.01%
Average Annual Damage (Contents)	0%	0%	0%	0%	0.01%	0.01%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0.01%	0.01%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	68	70	292	292

For **heat**, the annual electricity consumption for cooling is expected to go from 17,026 kWh in 2020 to 20,561 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,744 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 1% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	17,026	20,561
Average Annual Loss (Cooling, USD)	1,444	1,744
Average Annual Damage (Portion of Productivity Hours)	0%	1%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 361 in 2020 to USD 771 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 1,444 to USD 1,744 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 3,504,829 in 2020 and USD 7,474,404 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	361	771
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	1,444	1,744






Technical Cost of Insurance (USD)	6,826	14,536
Non-climate Risk Adjusted Forecasted Value (USD)	3,570,986	7,603,018
Total Climate Risk Value Adjustment (USD)	66,157	128,613
Climate Adjusted Value (USD)⁴	3,504,829	7,474,404

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter's baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it's important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

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Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

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The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

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Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

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Depth of flooding at the 10-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 20-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 50-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 100-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 200-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 500-yr return period (m)	0.03	0.03	0.03	0.03
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	88	88	88	89
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	97	97	97	97
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	108	108	108	108
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	116	116	116	116

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	124	124	124	124
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	144	145	144	144
Average annual wind speed (km/hr)	12	12	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	150	153	156	159
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	177	180	184	188
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	214	219	224	228
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	245	250	256	261
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	277	284	290	296
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	324	331	339	346
Total water equivalent precipitation for the year (mm)	1130	1137	1149	1167

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	10	12	14	17

Days per year with temperature above 38°C	2	2	3	3
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	6	6	7
Number of days per year where WBGT above 32°C	26	29	35	42
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	3	5
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	14.6	15.1	15.3	15.8
Days per year with temperature below 0°C	55	50	47	44
Days per year with temperature below -10°C	3	3	2	2
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	0.2	0	0.1	0
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.02	0.02	0.02	0.02

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.17	0.19	0.18	0.13

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.2	0.15	0.1	0.06
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	10	10	10	10

New Freedom Bldg #2 Location

302 Pleasant Ave. New Freedom PA US

(Coordinates: 39.4464, -76.4164)

Scenario: SSP2-4.5 (2.7°C) for Peril Metrics

CLIMATE RISK ASSESSMENT REPORT

This report provides a high-level overview of Climate Risk for **New Freedom Bldg #2** and is based on the output of Jupiter Intelligence **ClimateScore Global**. ClimateScore Global provides climate peril data to generate hazard values, and scores using the carbon emissions scenario SSP2-4.5 (2.7°C) with outputs in 5-year increments from 2020 through 2100. The climate peril metrics will provide projections of physical climate impacts such as the depth of flooding or speed of wind. The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two.

The climate scores are an aggregation of these exact metrics, to reflect the present-day level of hazard, how quickly it is expected to change in the next 30 years, and an overall average of the two. However, the scores are always pre-computed for the **SSP5-8.5 (4.4°C) scenario**, so please note the difference in scenarios for the peril metrics output and the scores in this report. For more alignment, kindly use the SSP5 template version for this report.

The economic impact data integrates physical climate risk into financial projections, providing a comprehensive assessment of the direct financial impact of physical climate change on operational and market risk.

Given the type of this asset, we would expect this structure to experience on an **average annual basis a loss** of USD 0 from **flood** events, a loss of USD 43 from **wind** events, a loss of USD 180 from a **wildfire** event, and a loss of USD 1,744 due to **heat** stress.

CLIMATE HAZARD SUMMARY

Table 1 | Climate Score Summary under the SSP5-8.5 Scenario

Overall Climate Score¹	25
Current Hazard Score (2020)	35
Change Score (2020-2050)	31
Percentile Overall Score Relative to Country:	55
Percentile Overall Score Relative to Admin1 level:	55

¹ The overall climate risk score represents a combination of the present day (2020) risk score and the 30-year (2050) change score taking into account all eight climate perils (unequally weighted) under a 3.3-5.7° C warming scenario. Overall scores are benchmarked to global occurrence so a score of 90 means that the weighted average of the underlying peril scores is greater than 90% of all other populated locations globally. A distinction should be made between the level of hazard that a location faces, and the resulting risk to the owner, insurer, and others if a location is exposed to said hazard.

Table 2 | Climate Score Summary by Peril under the SSP5-8.5 Scenario

Climate Peril	Current Hazard Score (2020)	Change Score (2020-2050)	Overall Climate Score (Current + Change)	Overall Rating ^{2,3} (Current + Change)
Flood	10	0	9	Lowest
Wind	19	2	17	Lowest
Heat	42	60	42	Moderate
Cold	59	-46	58	Moderate
Precipitation	58	57	54	Moderate
Wildfire	5	0	9	Lowest
Drought	25	54	57	Moderate
Hail	48	-69	-9999	-9999

² Methodology for overall climate risk rating: Lowest: 0-20; Low: 20-40; Moderate: 40-60; Elevated: 61-80; Severe: above 80

³ Overall Scores for Hail - Climate models vary wildly on future projections for hail thus values are highly uncertain, hence Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

Under the SSP5-8.5 (4.4°C) scenario, by 2050, **New Freedom Bldg #2** has a percentile overall score of 55 relative to its admin level 1 for climate hazards and has a percentile overall score of 55 relative to its country. The location is at moderate risk for extreme precipitation, moderate risk for heat stress, moderate risk for drought, lowest risk for flooding, lowest risk for extreme winds, lowest risk for wildfires, and moderate risk for cold under an SSP5-8.5 (4.4°C) warming scenario by 2100.

CLIMATE HAZARD SUMMARY BY PERIL

The table presented below provides a comprehensive summary of the key impacts of climate risk for **New Freedom Bldg #2**. For a full view of all metrics offered by Jupiter, please refer to Annex B at the end of this report.

Under the SSP2-4.5 (2.7°C) scenario by 2050, there are projected to be approximately 17 days per year exceeding 35°C (95°F) and 44 days per year below 0°C (32°F). The **New Freedom Bldg #2** location may also experience roughly 261 mm of maximum daily precipitation at the 100-year return period by 2050 and 0.03 meters of combined flooding. There is an annual wildfire probability of 0.02% predicted along with a 0.1 ratio of total water demand to water supply.

Note: In our data model, 0 simply means zero exposure, and -9999 means no data available for this metric at this location.

Table 3 | Climate Peril Metric Summary by Peril under the SSP2-4.5 Scenario

Climate Peril	Peril Metric	2020	2030	2050
Flood	Depth of the water (in meters) at the 100-year return period	0.03 m	0.03 m (0%)	0.03 m (0%)
	Annual depth of the water (in meters) in coastal areas due to high tide (Sea Level Rise)	0 m	0 m (0%)	0 m (0%)
Wind	Maximum 1-minute sustained wind speed (in km/hr) experienced at the 100-year return period	116 km/hr	116 km/hr (0%)	116 km/hr (0%)
	Average annual wind speed (in km/hr)	12 km/hr	12 km/hr (0%)	12 km/hr (-2%)
Heat	Annual number of days above 35°C	10 days	12 days (20%)	17 days (71%)
	Number of days per year where the Wet-Bulb Globe Temperature (WBGT) exceeds 32°C	26 days	29 days (12%)	42 days (59%)
	Cooling Degree Days	874 degree days	937 degree days (7%)	1061 degree days (21%)
Cold	Annual number of days below 0°C	55 days	50 days (-9%)	44 days (-21%)
	Heating Degree Days	2164 degree days	2081 degree days (-4%)	1906 degree days (-12%)
Precipitation	Maximum daily total water equivalent precipitation (in mm) experienced at the 100-year return period	245 mm	250 mm (2%)	261 mm (7%)
	Total water equivalent precipitation (in mm) for the year	1130 mm	1137 mm (1%)	1167 mm (3%)
Wildfire	Annual probability of wildfires (in %)	0.02%	0.02% (0%)	0.02% (0%)

Drought	Total water stress: human water demand / water supply for the local and upstream watersheds	0.1	0.1 (4%)	0.1 (6%)
Hail	Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.2 days	0.15 days (-25%)	0.06 days (-70%)

Please see the color legend for this table under Appendix A.

DAMAGE AND LOSS SUMMARY

The following tables offer a comprehensive overview of the damage and loss estimates associated with **New Freedom Bldg #2**, classified as **Medical and Surgical Equipment Manufacturing** according to the OED occupancy code convention. These impacts use the hazard metrics from ClimateScore Global and translate them to asset-level impacts on the physical building, the contents and inventory in the building, the expected downtime of an asset, and changes in annual costs for acute metrics such as flooding, wind, and wildfire.

For this location, our model projects approximately 0 days of annual downtime and physical damage impacts from **flooding**, resulting in financial losses of around USD 0 annually, under the SSP5-8.5 (4.4°C) scenario by 2050. Under the same scenario, the model projects approximately 0 days of annual downtime and physical damage impacts from **wind** damage, resulting in financial losses around USD 43 annually, by 2050. For **wildfire**, the model projects approximately 0 days of annual downtime and physical damage impacts resulting in financial losses of around USD 180 annually under the SSP5-8.5 (4.4°C) scenario by 2050.

Table 4 | Damage and Loss Metrics for Flood, Wind, and Wildfire under the SSP2-4.5 Scenario

Damage and Loss Metric	Flood		Wind		Wildfire	
	2020	2050	2020	2050	2020	2050
Average Annual Damage (Building)	0%	0%	0.01%	0.01%	0.01%	0.01%
Average Annual Damage (Contents)	0%	0%	0%	0%	0.01%	0.01%
Average Annual Damage (Inventory)	0%	0%	0%	0%	0.01%	0.01%

Average Annual Downtime	0 days	0 days	0 days	0 days	0 days	0 days
Average Annual Loss (Total, USD)	0	0	42	43	180	180

For **heat**, the annual electricity consumption for cooling is expected to go from 17,026 kWh in 2020 to 20,561 kWh in 2050, which is determined as the projected damage from cooling (measured in kW/h). This is connected to an expected cost of USD 1,744 by 2050 under the SSP5-8.5 (4.4°C) scenario, given the electricity usage and cooling system characteristics of the asset.

Under the same scenario, the portion of hours per day of lost productivity due to extreme heat will go from 0% in 2020 to 1% by 2050, with an expected cost of USD 0 by 2050.

Table 5 | Damage and Loss Metrics for Heat under the SSP2-4.5 Scenario

Damage and Loss Metric	2020	2050
Average Annual Damage (Cooling, kWh)	17,026	20,561
Average Annual Loss (Cooling, USD)	1,444	1,744
Average Annual Damage (Portion of Productivity Hours)	0%	1%
Average Annual Loss (Productivity, USD)	0	0

FINANCIAL IMPACT SUMMARY

Under the SSP2-4.5 (2.7°C) scenario, capital expenditures (physical building and contents) due to flood, wind, heat, and wildfire will go from USD 222 in 2020 to USD 475 by 2050. In the same scenario, operational revenues (physical inventory impacts and expected downtime) will go from USD 0 in 2020 to USD 0 in 2050 and operative expenditures will go from USD 1,444 to USD 1,744 in the same time frame. Due to these impacts, the climate-adjusted value of this location will be USD 2,155,198 in 2020 and USD 4,599,917 in 2050⁴.

Table 6 | Financial Impact Metrics for Flood, Wind, Wildfire, and Heat under the SSP2-4.5 Scenario

Financial Impact Metric	2020	2050
Capital Expenditures (CapEx, USD)	222	475
Operational Revenue (OpRev, USD)	0	0
Operational Expenditures (OpEx, USD)	1,444	1,744




Technical Cost of Insurance (USD)	4,205	8,956
Non-climate Risk Adjusted Forecasted Value (USD)	2,200,000	4,684,039
Total Climate Risk Value Adjustment (USD)	44,802	84,123
Climate Adjusted Value (USD)⁴	2,155,198	4,599,917

⁴In some cases, the impacts from climate change on an asset's value are so significant that the projected loss the 'Total Climate Risk Value Adjustment' comes up to the same value as the 'Non-climate risk adjusted forecasted value of the asset', and hence the 'Climate Adjusted Value is returned as zero.






APPENDIX A: GLOSSARY

This glossary is intended to provide more detail on some of the concepts and metrics used in this workbook. For a comprehensive methodology review, please refer to Jupiter's Knowledge Base within the ClimateScore Global App.

Score Rating Legend

Lowest	
Low	
Moderate	
Elevated	
Severe	

Climate Peril Metric Exposure Legend

Lowest Exposure	
Low Exposure	
Medium Exposure	
High Exposure	
Highest Exposure	

Scenarios

Jupiter uses the coordinated SSP-RCP scenarios that are developed for the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports. Jupiter models three scenarios: SSP1-2.6, SSP2-4.5, and SSP5-8.5. The numerical values of the RCPs (2.6, 4.5, 6.0, and 8.5) refer to the radiative forcing in 2100, in watts per square meter (W/m²).

SSP1-RCP2.6: The sustainable and “green” pathway describes an increasingly sustainable world. Global commons are being preserved, and the limits of nature are being respected. The focus is more on human well-being than on economic growth. Emissions growth continues to increase then begins leveling out by 2050 and declining after. This scenario is coupled with RCP 2.6 radiative forcing and is expected to lead to a global temperature increase of 1.3-2.2°C in 2100 compared to a 1986-2005 baseline average.

SSP2-RCP4.5: The “Middle of the road” or medium pathway extrapolates the past and current global development into the future. Income trends in different countries are diverging significantly. There is certain cooperation between states, but it is barely expanded. Emissions growth continues to increase then begins leveling out by 2050 and declining after. In the IPCC’s 6th Assessment Report, this scenario was deemed to be the “most likely” scenario. This scenario is coupled with RCP 4.5 radiative forcing, resulting in likely global warming of 2.1-3.5°C in 2100 compared to a 1986-2005 baseline average.

SSP5-RCP8.5: Fossil-fueled Development scenario, used by Jupiter to showcase the most extreme exposure anticipated for a location. Global markets are increasingly integrated, leading to innovations and technological progress. The social and economic development, however, is based on an intensified exploitation of fossil fuel resources with a high percentage of coal and an energy-intensive lifestyle worldwide. This includes continued greenhouse gas emissions growth through 2100, radiative forcing consistent with RCP 8.5, and a likely global warming of 2.6 - 4.8°C in 2100 compared to a 1986-2005 baseline average. While this is the most extreme scenario modeled, users should examine it critically given the uncertainties inherent in climate modeling.

Baseline and modeled years: Jupiter’s baseline represents climate conditions for 20 years centered on 1995, in alignment with the IPCC AR5 definition of the historical baseline period. For each modeled year, Jupiter considers the climate perils occurring in an 11-year time window surrounding the target year. For this reason, it’s important to note that 2020 is included as a modeled year since it represents the average of climate peril intensities between 2015 and 2025. Therefore, peril metrics in 2020 may vary slightly among the three modeled scenarios.

Scenario development until 2050: Generally speaking, significant differences are not expected in peril metrics and scores between the three emission scenarios until 2050, as the emissions in each scenario are not appreciably different over that time period. Real divergences that would logically align with the narratives of the SSP/RCP scenarios are more likely to appear from 2050 onwards as emissions diverge among the three scenarios. A related point is that outside of heat and cold perils (where generally there would be greater extreme heat expected with the hotter SSP5-8.5 scenario compared to SSP1-2.6) perils will not necessarily be ordered by scenarios. As a concrete example, a location should not a priori be expected to have reduced precipitation in a higher emissions scenario compared to a lower emission scenario for a given future year. For some locations, higher temperatures may lead to increased precipitation while in others a reduction in precipitation.

Return Periods are used to characterize the probability of an acute climate hazard event. The inverse of the return period is referred to as the annual exceedance probability. For example, a flood with a 100-year return period (also referred to as a 100-year flood) has an annual exceedance probability of $1/100 = 0.01$ (or 1%). Acute perils—extreme wind, flood, and precipitation—are measured by examining the severity of the peril metric at a fixed return period: the frequency is fixed, and the severity is variable. For example, `WS_windSpeed50yr` measures the wind speed at the fixed, 50-year return period. This is the opposite of many chronic metrics, in which the severity is fixed but the frequency is varied. For example, `HT_daysExceeding35C` measures the frequency—how many times per year—the daily high temperature crosses a fixed severity of 35°C. The acute peril metrics for Wind, Flood, and Precipitation are associated with return periods. For each of these peril metrics, outputs for six separate return periods are provided: 10, 20, 50, 100, 200, and 500 years.

Peril Metrics are the primary output of ClimateScore Global (CSG) and are complemented by economic impact metrics. Peril metrics themselves are values for physical quantities, like wind speed or flood depth, and they are derived from data generated by Global Climate Models. In CSG, peril metrics are used to characterize an asset's exposure to different perils. For example, the flood peril is quantified by the flood depth metric, measured in meters. On the other hand, the wildfire metric reports the annual probability of wildfires, expressed as a percent. Note that these two metrics are reported in vastly different units of measure, therefore the magnitude of the impact of different perils cannot be directly compared using peril metrics alone. **Acute Peril Metrics** are rare but damaging events, e.g. flooding, and wildfire. **Chronic Peril Metrics** are long-term changing trends e.g. sea level rise and changing precipitation patterns.

Scores can be used to summarize the physical climate hazard facing a location. Jupiter's scores are all calculated using the SSP5-8.5 scenario, as the conservative view for climate hazard, which maximizes the potential change and highlights areas of concern. Scores are an aggregation of selected peril metrics or for a weighted All Perils score, calculated from 0-100 in three different score types:

Hazard Score - Measures the exposure to a hazard in the present (using our first modeled year - 2020).

Change Score (2020-2050) - Measures the degree of change between 2050 and the baseline year.

Overall Hazard Score - Combines the hazard score and change score and benchmarks this value against a globally weighted average of the scores in populated areas.

Economic Impact Data starts with the peril metric input that calculates the exact intensity of climate hazards at a point location for assets. In the first step, the model uses some of the input asset characteristics to fit damage curves and calculate expected damages, physical as well as abstract, and the associated losses of these damages for different aspects of the assets (building, content, inventory, downtime).

In the next step, these different average annual loss types are then aggregated into "transmission channels" that lead to the calculation of overall impacts on the Building, the Inventory, the Contents, the Downtime, and the Overheads, considering market dynamic assumptions. In a third step, these transmission channels are used to provide measures for climate impact on operational and market risk metrics, such as CapEx, OpEx, and OpRev, as well as climate impacts on Technical Premium, Net Income, and Climate-adjusted Value. Please note that these models' accuracy can vary for certain asset types and is best geared towards residential and commercial data.

Peril Descriptions

Flood

Flood peril metrics include projected flood depths and flooded fraction for a given return period, with model runs including the effect of flood defenses. The flood model is itself the combination of models for three types of flooding events: coastal, fluvial, and pluvial flood events. Results are given as a combined flood depth derived from the maximum depths of all three types of flood. For the **Flood Score**, Jupiter aggregates the flood metric for the 200-year event, as it is a

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best-practice metric for stress-testing in the financial sector.

Wind

Wind peril metrics characterize extremes in wind speeds (storms) and how they might evolve in a changing climate. The acute wind speed peril metric represents the expected 1-minute sustained wind speed (in km/hr) experienced. Peril metrics are provided that characterize extreme events with year return periods of 200 years. Jupiter models tropical cyclones (TCs), European windstorms, and other large extratropical storms, which are responsible for producing the most extreme wind speeds. For the **Wind Score**, Jupiter uses the 100-year acute wind speed metric.

Precipitation

The **Precipitation** peril metrics quantify the expected precipitation amounts for extreme rainfall events at the 100-year return period. In contrast to the flooding metric, which also incorporates rainfall, this metric measures more specifically the volume of water that a location is exposed to, rather than the flood depth resulting from it. For the **Precipitation Score**, Jupiter uses the 100-year event for extreme rainfall.

Heat

Heat peril metrics characterize how temperatures might evolve in a changing climate, by measuring the heat stress thresholds. The metric Days above 35°C refers to the number of days per year where the temperature exceeds the 35°C threshold. Additionally, the metric Days above 35 Wet Bulb Globe Temperature (WBGT), depends on the magnitude of the threshold temperature and the way that temperature is measured. Hot days can be measured based on the dry bulb temperature or wet bulb globe air temperature. Dry bulb temperature is the typical air temperature measure that is used in everyday life. Wet Bulb Globe Temperature (WBGT), in contrast, is a measure of heat stress on the human body. It accounts for the air moisture content and temperature to determine how effectively humans can cool themselves. The metric Cooling Degree Days is the annual sum of the daily mean temperature minus 18°C. This peril metric is widely used as a simple measure of the relative demand for air conditioning. The **Heat Score** aggregates three heat metrics - Days above 35°C, Days above 32WBGT, and Cooling Degree Days - to account for several aspects of heat exposure.

Cold

Cold peril metrics characterize how extreme low air temperatures might evolve in a changing climate. Cold days refer to the number of days per year where the air temperature meets or drops below a threshold. Additionally, the Heating Degree Days peril metric is computed daily by counting the number of degrees that the mean daily temperature is below a specific temperature threshold, and then summing these differences across all days of the year. The **Cold Score** aggregates two metrics - Days below 0°C and Heating Degree Days - to reflect a broad angle on cold exposure.

Wildfire

The **Wildfire** peril metric quantifies the probability that a given location will experience a catastrophic wildfire (either starting at or spreading to that location). A “catastrophic” wildfire escapes initial containment attempts and becomes large enough to threaten structures. The **Wildfire Score** aggregates this metric.

Drought

Drought peril metrics characterize how extreme drought conditions may change in future climates. The Standardized Precipitation Evapotranspiration Index (SPEI) is used for estimating meteorological drought, and Water Stress is used for estimating socioeconomic drought. Water stress is an indication of the competition over water, and is defined as the demand for water (demand) divided by available water (supply). For the **Drought Score**, Jupiter uses the "Total Water Stress" metric.

Hail

Hail and severe thunderstorms are complicated, localized perils that are difficult to simulate even for modern numerical weather forecasting systems. For this reason, understanding how climate change might affect the future frequency of hail and severe weather typically focuses on how supportive the daily weather environments are for producing severe thunderstorms.

-9999 - Output that contains the value -9999 is when the data cannot be computed due to missing source data. This can occur in a few different peril metrics for several reasons, such as tidal data not being available for inland locations, data points that do not fall in our Digital Elevation Module (DEM), or water stress locations that do not fall in a particular watershed. This value is also returned for the hail overall score because climate models vary wildly on future projections for hail thus values are highly uncertain. Therefore, Jupiter does not determine an assessment for future hail peril in some cases and returns a value of -9999.

APPENDIX B: DETAILED JUPITER OUTPUT
Table 7 | Flood Peril Metrics

Hazard Metric	2020	2030	2040	2050
Depth of flooding at the 10-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 20-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 50-yr return period (m)	0.02	0.02	0.02	0.02
Depth of flooding at the 100-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 200-yr return period (m)	0.03	0.03	0.03	0.03
Depth of flooding at the 500-yr return period (m)	0.03	0.03	0.03	0.03
Annual depth of the water (in meters) in coastal areas due to high tides and sea-level rise	0	0	0	0

Table 8 | Wind Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum 1-minute sustained wind speed at the 10-yr return period (km/hr)	88	88	88	89
Maximum 1-minute sustained wind speed at the 20-yr return period (km/hr)	97	97	97	97
Maximum 1-minute sustained wind speed at the 50-yr return period (km/hr)	108	108	108	108
Maximum 1-minute sustained wind speed at the 100-yr return period (km/hr)	116	116	116	116

Maximum 1-minute sustained wind speed at the 200-yr return period (km/hr)	124	124	124	124
Maximum 1-minute sustained wind speed at the 500-yr return period (km/hr)	144	145	144	144
Average annual wind speed (km/hr)	12	12	12	12

Table 9 | Precipitation Peril Metrics

Hazard Metric	2020	2030	2040	2050
Maximum daily total water equivalent precipitation at the 10-yr return period (mm)	150	153	156	159
Maximum daily total water equivalent precipitation at the 20-yr return period (mm)	177	180	184	188
Maximum daily total water equivalent precipitation at the 50-yr return period (mm)	214	219	224	228
Maximum daily total water equivalent precipitation at the 100-yr return period (mm)	245	250	256	261
Maximum daily total water equivalent precipitation at the 200-yr return period (mm)	277	284	290	296
Maximum daily total water equivalent precipitation at the 500-yr return period (mm)	324	331	339	346
Total water equivalent precipitation for the year (mm)	1130	1137	1149	1167

Table 10 | Temperature (Heat and Cold) Peril Metrics

Hazard Metric	2020	2030	2040	2050
Days per year with temperature above 35°C	10	12	14	17

Days per year with temperature above 38°C	2	2	3	3
Days per year with high temperatures exceeding the local historical (1980-2010) 99th percentile high temperature	5	6	6	7
Number of days per year where WBGT above 32°C	26	29	35	42
Relative Heat Wave (Number of 3-day periods per year with daily max temperature exceeding the local historical (1980-2010) 95th percentile max temperature)	1	2	3	5
Absolute Heat Wave (Number of 3-day periods per year with daily max temperature exceeding 35°C and daily min temperature exceeding 24°C)	0	0	0	0
Average annual temperature (°C)	14.6	15.1	15.3	15.8
Days per year with temperature below 0°C	55	50	47	44
Days per year with temperature below -10°C	3	3	2	2
Absolute Cold Wave (Number of 3-day periods per year with the average of the daily max and min temperatures below -5°C)	0.2	0	0.1	0
Relative Cold Wave (Number of 3-day periods per year with daily min temperature below the local historical (1980-2010) 10th percentile min temperature)	0.2	0	0	0

Table 11 | Wildfire Peril Metric

Hazard Metric	2020	2030	2040	2050
Annual probability of wildfires (in %)	0.02	0.02	0.02	0.02

Table 12 | Drought Peril Metrics

Hazard Metric	2020	2030	2040	2050
Total water stress: human water demand/water supply for the local and upstream watersheds	0.1	0.1	0.1	0.1
Mean months per year where the rolling 6-month average SPEI is below -2	0.17	0.19	0.18	0.13

Table 13 | Hail Peril Metrics

Hazard Metric	2020	2030	2040	2050
Number of days per year where large hail (+2 in/ 5 cm in diameter) is possible	0.2	0.15	0.1	0.06
Mean number of days per year where environmental conditions are conducive to severe thunderstorms	10	10	10	10