

ASSESSING CLIMATE RISK FOR RAYTHEON TECHNOLOGIES

Group Project Executive Summary | Spring 2021

Margaret Brickner, Jordan Faires, Derek Nguyen and Paul Rikhter

Faculty Advisors

Dr. Matthew Potoski and Dr. Eric Masanet



THE PROBLEM

Climate change is increasing the frequency and severity of many extreme weather events in unpredictable ways. Businesses recognize that this may threaten operations, sites and employees. However, most businesses do not fully understand the risks posed by extreme weather events or how climate change will affect this risk over time. Furthermore, the measurement of climate risk for businesses remains a significant challenge due to a lack of guidance, tools and methodologies.

This project helps to address these challenges by developing a framework and tools to quantify climate-related risk for Raytheon Technologies Corporation sites, contributing open-source methods for climate risk assessment to a rapidly emerging field.

Why Do Companies Care About Climate Risk?



Improve Disaster Response

Informed planning can ensure employee safety, reduce damage and prevent operational losses.



Guide Investments and Strategy

Understanding site-level risk can help prioritize investment in climate resilience and guide sustainability strategy.



Meet Stakeholder Expectations

Investors increasingly expect companies to disclose climate risk. Governments are considering making disclosures mandatory.

FINDINGS

1 Raytheon Technologies sites are already at risk from climate-related events.

This risk continues to increase through 2040 under both optimistic and pessimistic emissions scenarios.

2 Risk is variable across climate hazard, site location and time.

Climate hazards, such as hurricanes, wildfire and extreme heat, will impact sites in different ways. These differing risk profiles pose challenges for corporate-wide disaster preparedness strategy and suggest that a tailored approach to climate resiliency investments will be necessary to maximize benefits.

3 Climate change will likely increase costs for Raytheon Technologies.

Increasing severity or probability of extreme events will lead to increased costs. The probability of a single catastrophic event remains low through 2040. However, the cost of such an event would be very high.

Raytheon Technologies should take steps to mitigate these potential impacts.

APPROACH

This project quantified physical climate risk for 21 Raytheon Technologies sites through 2040. It evaluated risks posed by five climate hazards:



Climate risk was quantified through hazard-specific risk scores and estimated financial costs for each site. This relied on hazard and climate data from public sources, as well as site-specific data such as total site value and employee headcount. Financial costs were calculated for direct site damages, utility cost increases and employee health costs. Risk score heat maps generated through the project (**Figure 1**) allow Raytheon Technologies staff to easily determine sites at greatest risk from each hazard.

Hazard	Site A	Site B	Site C	Site D	Site E	Site F	Site G	Site H	Site I	Site J	Site K	Site L	Site M	Site N	Site O	Site P	Site Q	Site R	Site S	Site T	Site U
Extreme Heat	3	3	2	2	3	4	3	2	6	5	2	3	3	2	5	3	4	2	5	3	3
Flooding	5	4	4	4	3	10	4	8	3	16	3	8	3	2	3	4	3	3	5	4	8
Wildfires	4	14	4	4	2	6	5	6	6	15	2	5	4	3	3	9	6	2	18	12	12
Hurricanes	-	-	-	-	8	-	-	9	-	-	-	10	-	-	10	-	11	10	12	-	-
Water Stress	4	9	5	5	3	12	5	4	8	9	2	4	4	5	4	7	3	4	11	8	9
Average Score	4	8	3	4	4	8	4	6	5	11	2	6	3	3	5	6	6	4	10	7	8

Figure 1. Example of an anonymized risk score heat map showing hazard-specific score results for each site (A - J) at present-day. Additional heat maps were generated for 2025, 2030 and 2040 for a low (RCP 4.5) and high (RCP 8.5) emissions scenario.

The results of the risk assessment framework developed through this project were presented in an Excel-based tool. This tool also allows for risk analysis of new sites outside of the project scope.

IMPACT

This research enables Raytheon Technologies to better prepare for the impacts of climate change. Raytheon Technologies can use the tools and methods developed through this project to educate internal stakeholders about climate risk and strengthen risk management procedures. They can also use these tools to inform climate mitigation strategy, such as by evaluating locations for potential on-site renewable energy projects. Meanwhile, Raytheon Technologies can use the Excel-based risk tool to assess additional sites outside of the project scope, expanding their understanding of corporate-wide climate risks and opportunities.

The project demonstrates that measuring climate risk is feasible for businesses. However, improved transparency and standardization is necessary to strengthen corporate climate risk management. Despite challenges, we showed that quantifying physical climate risk is possible using existing guidance and open-source data. The framework developed here can be used by other businesses to better understand climate risk, or it could be adapted for use by public-sector organizations such as local governments or utilities. Further coordination and investment in open-source climate risk tools could enable stronger decision-making for the private and public sector alike.