ZEBRA TECHNOLOGIES CORPORATION: CLIMATE-RELATED PHYSICAL RISK CHARACTERIZATION AND ANALYSIS

SOLUTION OVERVIEW

Zebra Technologies Corporation is a global leader providing Enterprise Asset Intelligence (“EAI”) solutions in the Automatic Identification and Data Capture (“AIDC”) industry. The AIDC market consists of mobile computing, data capture, radio frequency identification devices (“RFID”), barcode printing, and other automation products and services. The Company’s solutions help customers and end-users achieve their critical business objectives, including improved operational efficiency, optimized workflows, increased asset utilization, and better customer experiences. Scenario analysis can overcome the barriers by providing a flexible “what-if” framework to explore how the climate risks change over time in terms of hazard, exposure, and vulnerability. As recommended by The Task Force on Climate-related Financial Disclosures (TCFD), Zebra conducted climate scenario analysis in 2021 using guidance from the Intergovernmental Panel on Climate Change (IPCC) to determine climate risks under the best- and worst-case scenarios for its operations and value chain.

ORGANIZATION TYPE

Industrial

BARRIER

The long-time horizon for climate-related risks, high uncertainty, and complexity poses a challenge to standard risk assessment methodologies

SOLUTION

Zebra conducted climate scenario analysis in 2021 using guidance from the Intergovernmental Panel on Climate Change (IPCC) to determine climate risks under the best- and worst-case scenarios for its operations and value chain in collaboration with the U.S. Department of Energy’s Argonne National Labs

OUTCOME

The analysis helped Zebra gain better insights for climate-related risk preparedness at both tactical and strategic levels

POLICIES

At Zebra, corporate sustainability priorities include Climate, Resource Conservation, and Human Capital. Initiatives include energy-efficient operations, certified refurbished circular economy and eco-friendly products, protecting and developing its employees, and investing in the communities where they work and live. Zebra is committed to pursuing science-based targets for climate change across its operations and value chain globally. The climate scenario analysis supplements Zebra's existing business continuity planning and enterprise risk management processes.

Zebra believes that preparing for potential climate impacts is essential to ensure continuing operations, and that strategies of both decarbonization as well as preparedness are important in tandem. Their approach aligns with the Biden Administration imploring the private sector to adopt both decarbonization and preparedness strategies in its Roadmap to Build a Climate Resilient Economy [1]and was highlighted in Zebra's interview as part of the Decarbonization Download series on the Better Buildings Solution Center.

1. The White House, U.S. Climate-Related Financial Risk Executive Order 14030, A ROADMAP TO BUILD A CLIMATE-RESILIENT ECONOMY, Page 10, October 14, 2021, https://www.whitehouse.gov/briefing-room/presidential-actions/2021/05/20/executive-order-on-climate-related-financial-risk/

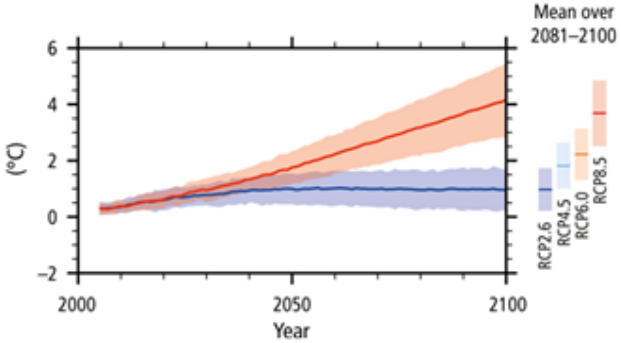
PROCESS

The Task Force on Climate-related Financial Disclosures (TCFD) recommends that organizations use climate scenario analysis in their planning processes and disclose how resilient their strategies are under a range of scenarios. Zebra analyzed both best- and worst-case climate scenarios to understand how the risks might evolve. The IPCC guidance provides the framework to determine the overall climate risk based on the three core components (hazard, exposure, and vulnerability). Zebra applied the IPCC framework to determine the climate risks across its operations, supply chain, and customer segments.

Figure 1

Scenarios: Projected increase of global mean surface temperature by the end of the 21st century (2081–2100) relative to 1986–2005

Representative Concentration Pathway	Projected Increase in Temperature
RCP2.6	**0.3°C to 1.7°C**
RCP4.5	1.1°C to 2.6°C
RCP6.0	1.4°C to 3.1°C
RCP8.5	**2.6°C to 4.8°C**



The best-case scenario was analyzed in terms of average global temperate rising to 2°C, while the worst-case scenario was analyzed in terms of average global temperature rising by 4°C by 2100. The IPCC has generated several future climate scenarios based on this measure, referred to as the Representative Concentration Pathways (RCPs). The RCP 2.6 and 8.5 scenarios roughly align with the best- and worst-case scenarios analyzed by Zebra. Figure 1 shows the linkage between the

RCP scenarios and warming levels. Because there are no guarantees in how businesses and individuals will reduce or mitigate greenhouse gas emissions in the coming decades, and consequently how much warming will occur, Zebra picked the lower and upper-warming bands for the best-case and worst-case scenario analysis.

Zebra reviewed published studies referenced in IPCC that use climate models to project the potential for adverse impacts in locations relevant to its operations and value chain. The studies pointed to a range of intensifying climate hazards, such as drought, flooding, wildfires, and high winds. For Zebra, the review determined flooding as the predominant climate hazard even under the "well below 2°C" scenario as early as 2040. This scenario projects flood hazards to broadly impact the lower-lying areas of Southeast Asia, where many Zebra suppliers are located. The projected flood hazard affects these areas under lower levels of warming but broadens to the entire Southeast Asia coastline if warming levels increase by 4°C, based on the projected change in flood hazard relative to a 100-year flood return period [2].

Besides flooding, other long-term hazards included extreme wind-related weather events like hurricanes/typhoons/tornados, drought, and the combination of sea-level rise and extreme weather events. The analysis of these hazards, concluded that a combination of sea-level rise and extreme weather events emerges longer-term, beyond 2040 [3].

Figure 2

Zebra's Climate Risk Assessment Framework

Core Components of Risk	Data Assessed	Characterization of Risk and Point Allocation			
		High (4 points)	Moderate (3 points)	Low (2 points)	Very Low (1 point)
Hazard	Flood return period	15 years	38 years	62 years	100 years
Exposure	Business importance	4	3	2	1
Vulnerability	Elevation	under 20 feet	from 21-40 feet	from 41-100 feet	over 100 feet
Overall	2 x Hazard x Exposure x Vulnerability	Ranges from 1 point to 128 points			

Figure 2 shows Zebra's risk assessment framework based on IPCC's climate risk characterization using hazard, exposure, and vulnerability. Data on flood return period, business importance, and site elevation were used as proxies for hazard, exposure, and vulnerability characterizations. The analysis covered all facilities deemed important to its business, as of FY2021, including those operated by Zebra and those outsourced. Zebra allocated business importance by location. Each location was then scored for each dataset on a scale of 1-4, 1 being the lowest risk and 4 the highest.

See Figure 3 for climate risk exposure ranking by indirect supplier concentration. The indirect supply climate risk analysis was based on sole-source and single-source supply chain component dependencies aggregated by watershed. This allowed Zebra to capture a significant portion of

suppliers' operational footprint without attempting to identify and review individual locations because of the complex electronics industry supply chain, with many layers of specialized providers for fabrication, assembly, testing, etc., spread across different regions and countries. The watershed aggregations were scored for exposure risk on a scale of 1-3, 1 being the lowest risk and 3 the highest. Regions where Zebra has minimal indirect supplier dependency, like the Philippines and Indonesia watersheds, show lower overall climate risk. While these locales have significant flood hazards, indirect suppliers in these locales have a lower exposure ranking due to fewer sole-source or single-source dependencies.

Figure 3

Indirect Supplier Watershed Climate Risk Exposure Rankings

Zebra Footprint Watershed	Locations	Exposure Ranking
177 Southeastern China/Taiwan 176 China Yangtze River/Shanghai 173 North Coastal China/Japan/Korea	Over 20	3
179 Thai/Malaysia/Singapore	From 10 to 20	2
79 Western Europe 174 China Jiangsu/Shandong 283 US Pacific Columbia River Basin 365 US Pacific Central 372 Philippines Manilla 282 US Pacific Northwest 355 US Upper Missouri Basin 358 US/Mexico Rio Grande Basin 333 Upper Mississippi Basin 339 US Atlantic Northeast 370 Indonesia	From 2 to 10	1
366 Australia - Victoria 357 US Texas Gulf Basin 361 Central America	One or less	0

Watershed numbers are from World Bank, https://climateknowledgeportal.worldbank.org

Zebra also examined its exposure to customer-related climate risk. An analysis of Zebra's top 10 customer areas by revenue, looking at distributor point of sale, revealed the average customer concentration is less than 5% by metropolitan area and under 7% by watershed. Zebra's customer base is geographically diverse, and while most are within the U.S., they are relatively spread out in the watershed. These top areas were further analyzed in terms of elevation, and all were located at

least 150 feet above sea level, reducing vulnerability to flood hazards. Consequently, the customer-related risk was determined to be of lower significance overall.

2. Oppenheimer, M., B.C. Glavovic , J. Hinkel, R. et. al., 2019: Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities. In: *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* [H.-O. Po?tner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegri?a, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]. In *press*.

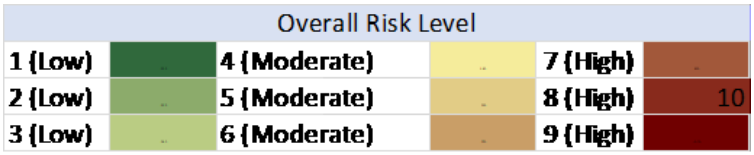
3. Hirabayashi, Y., Tanoue, M., Sasaki, O. *et al.* Global exposure to flooding from the new CMIP6 climate model projections. *Sci Rep* **11,** 3740 (2021). https://doi.org/10.1038/s41598-021-83279-w

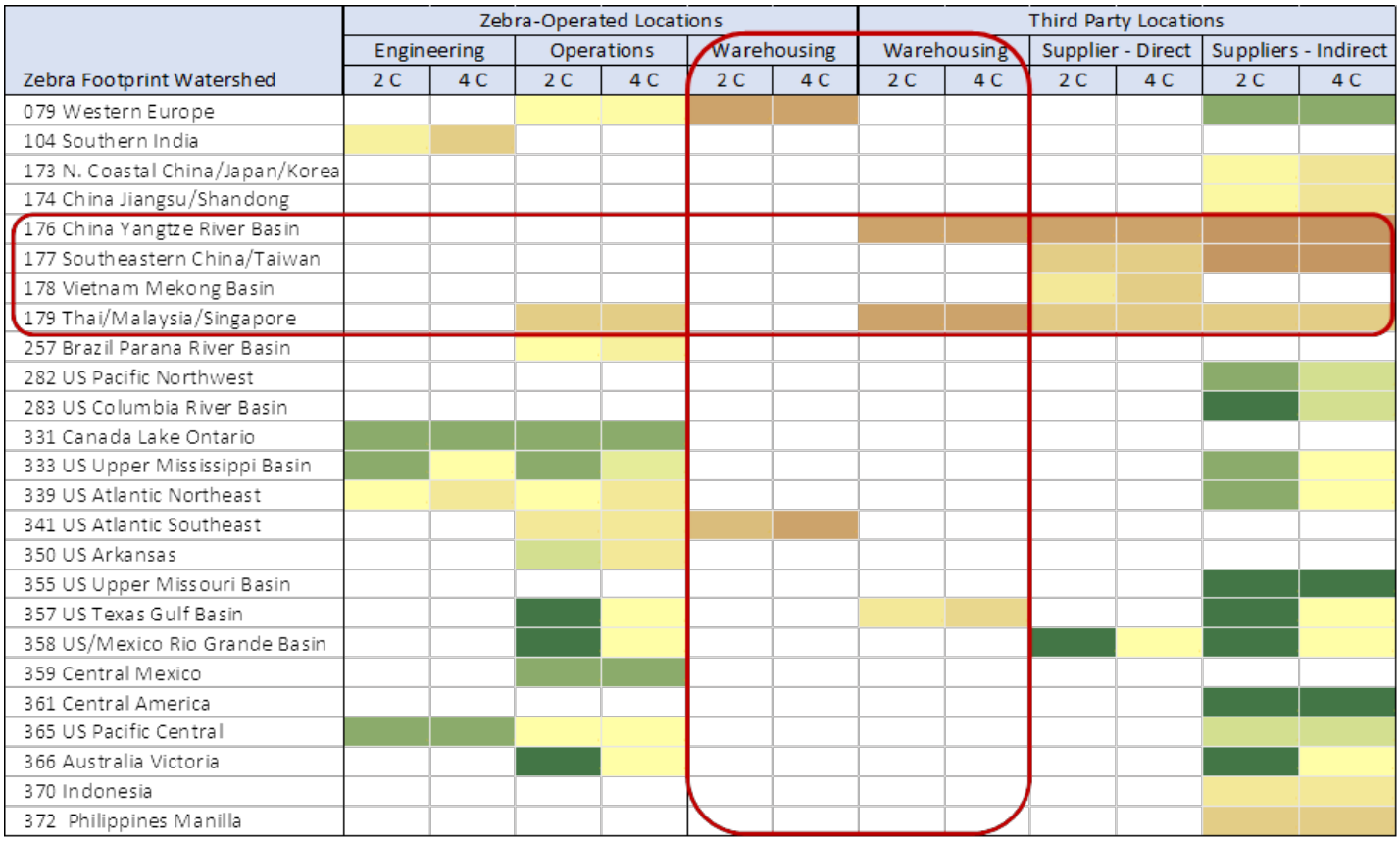
OUTCOMES

See Figure 4 for a visual comparison of the climate risk under the best-case and worst-case scenarios. In the 2°C best-case scenario, there are elevated/moderate risks around low-lying areas in Southeast Asia, where Zebra has third-party operated warehouses, direct and indirect supplier facilities. In the 4°C worst-case scenario, climate risks increase to moderate levels at more locations, including an engineering facility in India (Watershed 104) and indirect supplier facilities in parts of coastal Asia (Watersheds 173,174, and 178). The warehouse facilities near the shipping ports remain at moderately elevated levels of overall climate risk. While overall climate risks remain at moderate levels at third-party facilities within Zebra's value chain, most of the company's core operations do not show levels of climate risk that exceed low to moderate, as they are either located in areas with lower hazard levels within North America and Europe or lower levels of business criticality.

Additional hazards that could impact Zebra under the 4°C scenario include coastal exposure to more frequent and intense extreme weather events combined with rising sea levels. Modeling of these hazards is not well understood, so they were not factored into overall climate risk at this time. Zebra expects to monitor such hazards more broadly, should they become significant, and may include them as necessary in subsequent disclosures.

Figure 4





TOOLS AND RESOURCES

IPCC 2014 Synthesis Report: AR5 Synthesis Report: Climate Change 2014 — IPCC

TCFD Recommendations: Recommendations of the Task Force on Climate-Related Financial Disclosures (fsb-tcfd.org)

MEASURING SUCCESS

The scenario analysis helped Zebra identify areas of climate risk in its operations and value chain. The risk assessment framework helped Zebra translate climate data science into actionable insights. There is considerable uncertainty in modeling extreme typhoon events combined with rising sea levels, and the projected impacts of the climate interplay are not well understood in the scientific community. In our quest to learn more about climate-related risks, we hope to continue our collaboration with climate scientists at the U.S. Department of Energy's Argonne National Labs and build on the work described here.

In summary, Zebra has identified flooding as the predominant climate hazard within the next 20-30 years and sees flooding potentially impacting lower lying areas of Southeast Asia, which includes coastal China, Taiwan, Vietnam, Thailand, Singapore, and Malaysia, where Zebra's suppliers have a physical presence. The analysis examined climate hazard level, exposure, and vulnerability under

the best- and worst-case climate scenarios, and covered all significant facilities as of FY2021. Zebra's climate risk analysis included locations operated by Zebra and those outsourced, indirect suppliers and customers.

The climate assessment shows that risks exist, but none with the potential to have a substantive financial or strategic impact on business in the next 5-10 years, the typical time horizon for Zebra's long-term risk assessment. There is considerable uncertainty in modeling extreme typhoon events combined with rising sea levels due to climate change. Given the uncertainty, Zebra is engaging with key suppliers in the Southeast Asia region to understand better how they manage climate-related risks.