

Using Weather & Climate Data To Advance Retail Sustainability, Asset Protection, & Operational Resilience

RILA Retail ESG Initiative



**RETAIL INDUSTRY
LEADERS ASSOCIATION**

September 8, 2022

WELCOME



Erin Hiatt
Vice President,
Corporate Social Responsibility
RILA

erin.hiatt@rila.org

AGENDA

1. Welcome & Introductions | Antitrust
2. Overview of NOAA Environmental Data with Deke Arndt, NOAA NCEI
3. Overview of Argonne's CCRDS approach with Tom Wall, Argonne
4. Case Studies with Jess Filante, AT&T and Mani Balakrishnan, Zebra
5. Q&A with speakers
6. Discussion
7. Next Steps

Antitrust Statement

RILA believes strongly in competition. Our antitrust laws are the rules under which our competitive system operates. It is RILA's policy to comply with both the letter and the spirit of antitrust laws. This Antitrust Statement has been adopted to avoid even the appearance of impropriety under the antitrust laws.

At any association meeting, participants must avoid any discussion of the following subjects in order to avoid even an appearance of impropriety:

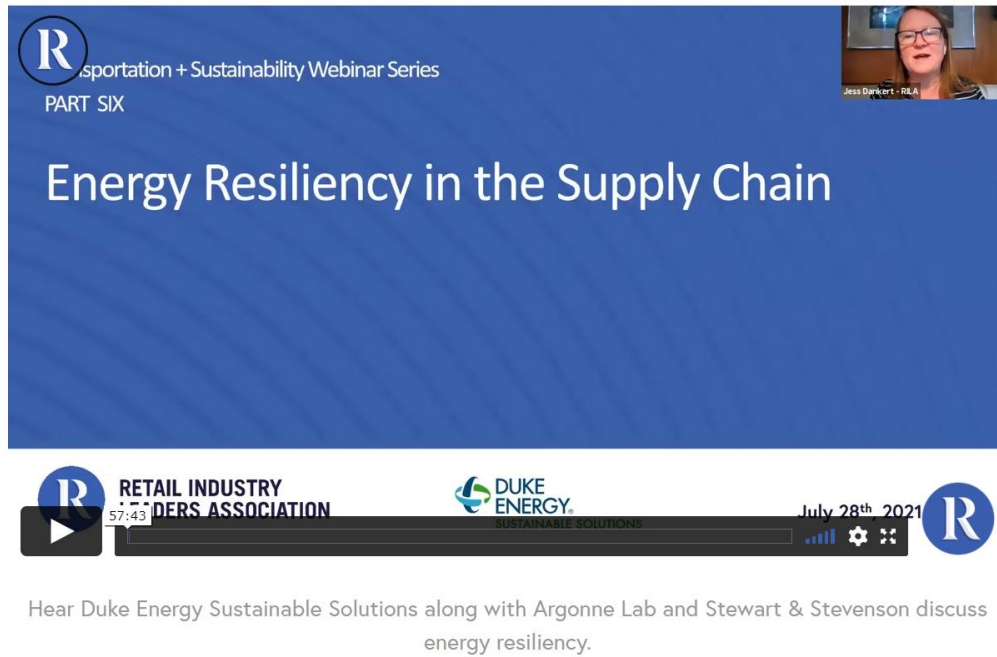
- Do not discuss current or future prices, price quotations or bids, pricing policies, discounts, rebates, or credit terms.
- Do not discuss cost information such as production costs, operating costs, or wage and labor rates.
- Do not discuss profits or profit margins, including what is a "fair" profit margin.
- Do not discuss allocating markets, territories, or customers.
- Do not discuss current or future production or purchasing plans, including plans to take facility downtime, production quotas, or limits on output.
- Do not discuss refusing to deal with any suppliers, customers, or competitors (or any class or type of suppliers or customers).
- Do not require or pressure any supplier, customer, or competitor to adopt any particular actions or policies.
- Never agree on any aspect of future pricing or output.

Do not engage in prohibited discussions before a meeting or after a meeting is over. These antitrust guidelines apply not only in formal RILA meetings, but also in hallways, casual conversations, phone calls, emails, text messages, cocktail parties, golf outings, or any other setting that is related in any way to the RILA. If you have questions or concerns, or if you are uncertain about the propriety of any subject of discussion or proposed activity, you should stop the discussion immediately and bring the issue to the attention of RILA staff, or consult your company's general counsel.

BROADER CONTEXT

How might weather and climate data analysis...

- ...support existing supply chain and asset protection/loss prevention preparedness and resiliency efforts?
- ...inform product procurement and merchandising?
- ...support ESG efforts and evolving reporting expectations re: TCFD, SASB/ISSB, SEC reporting on risk evaluation and scenario analysis?



Spotlight: Energy Resiliency in the Supply Chain

- In the final webinar of RILA's 2021 Transportation & Sustainability Series, Argonne National Laboratory spoke about the current and future state of energy resiliency.
- Listen to the recording and view the slides [here!](#)

NOAA INFORMATION FOR CLIMATE RESILIENCE AND SUSTAINABILITY

BY [ERIN HIATT] | 06/17/2022

By Derek Arndt, Jenny Disen, Michael Brewer, Erin Hiatt, Emily McAullife

In October 2021, the U.S. The Department of Commerce (DOC) worked with RILA's Erin Hiatt and several retailers to coordinate a listening session for the retail industry and the National Oceanic and Atmospheric Administration (NOAA). The goal of the session was to understand needs and opportunities to better leverage NOAA's climate information for the retail industry's tactical and strategic decision-making around climate resilience and sustainability.



Spotlight: NOAA Information for Climate Resilience and Sustainability

- In October 2021, the U.S. The Department of Commerce (DOC) worked with RILA's Erin Hiatt and several retailers to coordinate a listening session for the retail industry and the National Oceanic and Atmospheric Administration (NOAA).
- The goal of the session was to understand needs and opportunities to better leverage NOAA's climate information for the retail industry's tactical and strategic decision-making around climate resilience and sustainability.
- Read a blog recapping the session [here!](#)

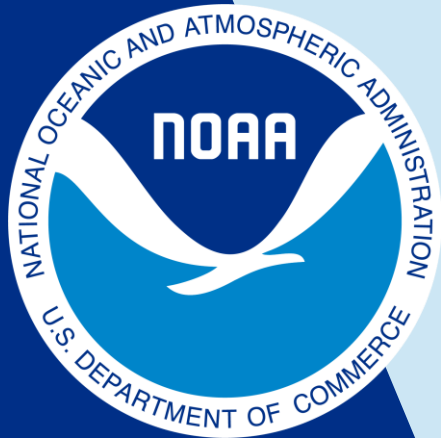
REMINDERS

1. Recording and slides will be shared as follow up, along with relevant links/resources
2. Please participate in aggregated audience polls!
3. How to ask a question or make a comment:
 1. Pose questions at any time via the Q&A box. Only questions submitted with the Q&A box will be considered. We will answer them during the Q&A portion of the agenda.
 2. Feel free to use chat to otherwise provide comments or respond to open-ended panelist questions (including "Other" option in live polls).

DEKE ARNDT

CHIEF OF CLIMATE SCIENCE AND
SERVICES DIVISION
NOAA NATIONAL CENTER FOR
ENVIRONMENTAL INFORMATION





National Centers for
Environmental Information (NCEI)
September 2022

NOAA / RILA Relationship

... and some information from NCEI

Deke Arndt (and *Jenny Dissen* and Mike Brewer)
National Centers for Environmental Information
North Carolina Institute for Climate Studies

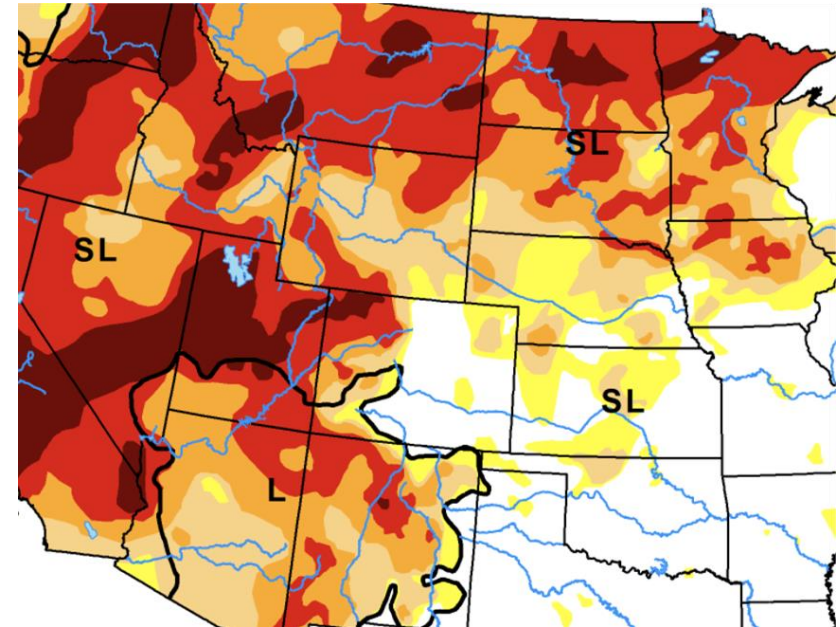
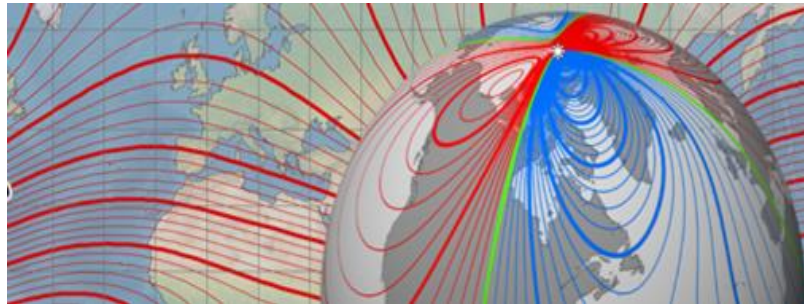
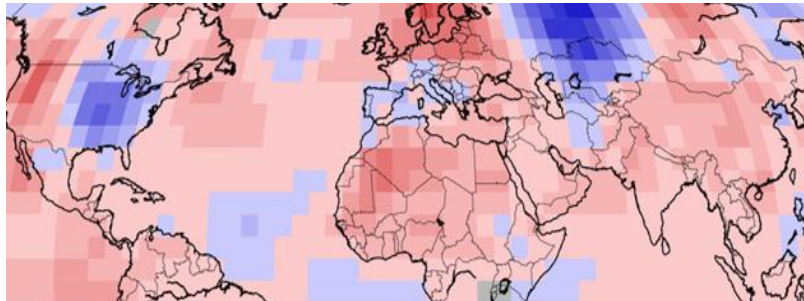
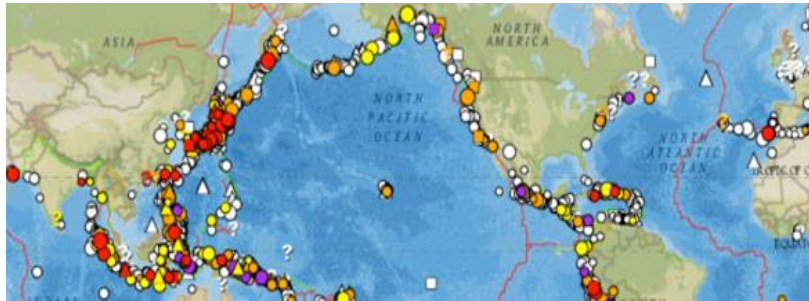
NCEI Products and Services

Range of Products

- Time scale: Hourly to Decadal
- Geographic scale: Local to Global

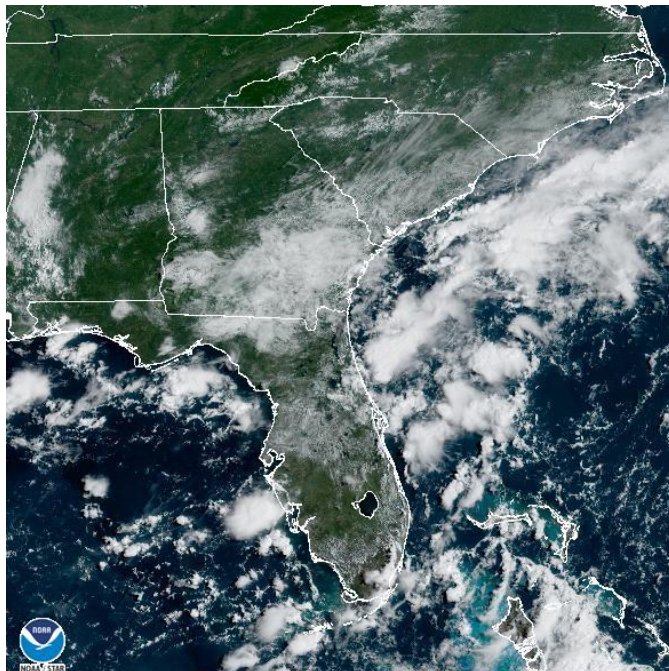
Technical Expertise

- Aerosols to Coastal Inundation
- Drought Monitoring to Ocean Surface Winds
- Paleoclimatology to US/Global Climate Monitoring

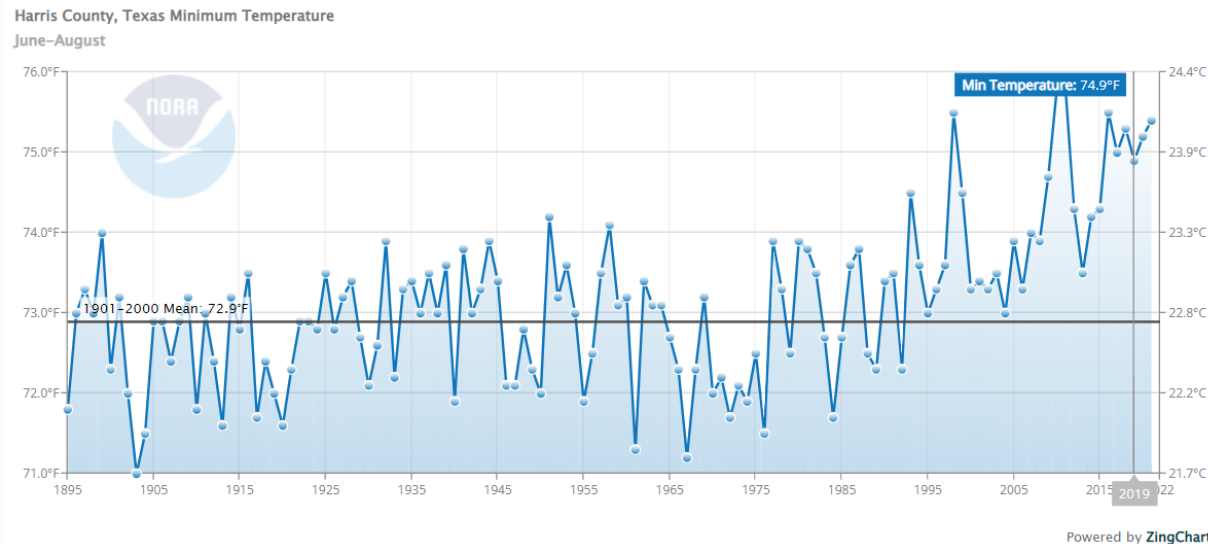


Current / Recent / Historical data

explains events and outcomes, aligns with your history, informs case studies, feeds your models with ground-truth



28 Aug 2022 14:46Z - NOAA/NESDIS/STAR se - GEOCOLOR Composite



▲	DATES	VALUE	RANK	DEPARTURE FROM MEAN (72.9°F) 1901–2000 BASE PERIOD
	202106 - 202108	75.4°F	123	2.5°F
	202006 - 202008	75.2°F	121	2.3°F

STATE OF THE CLIMATE IN 2021

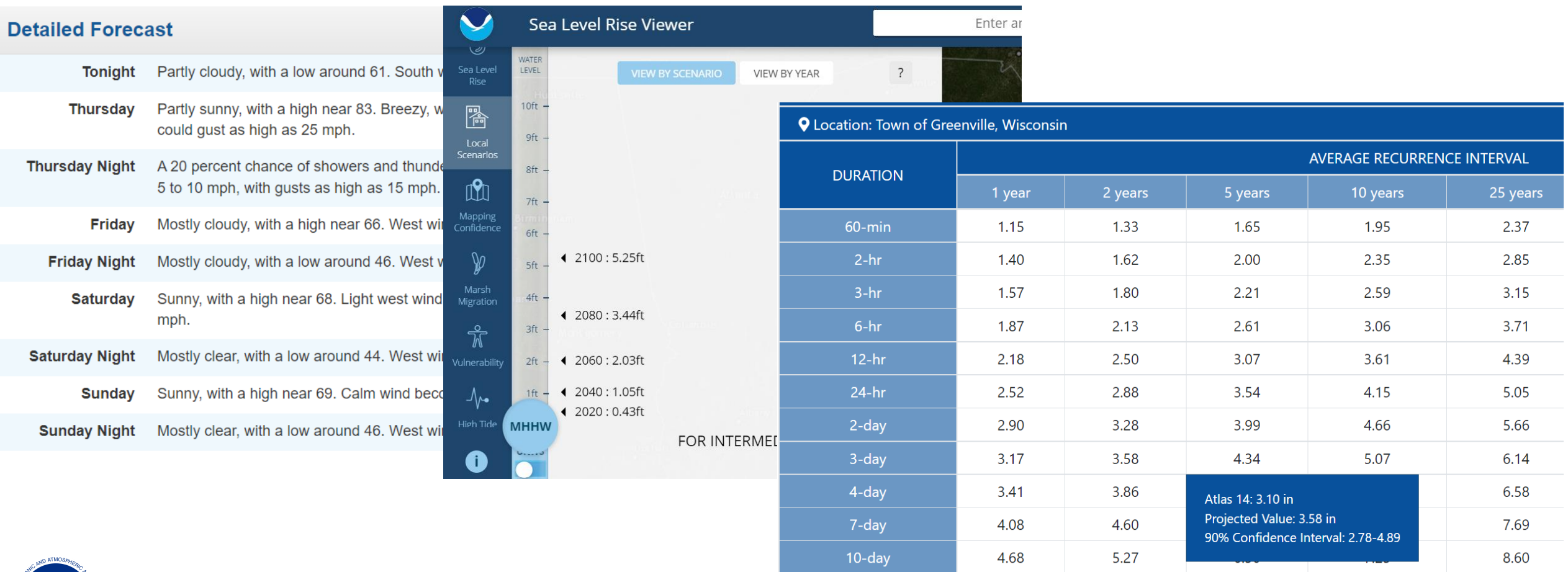


Special Supplement to the
Bulletin of the American Meteorological Society
Vol. 103, No. 8, August 2022

What is “Normal” in Ft. Lauderdale? What is the current drought condition in Lincoln? How severe was the drought of 2012?

Future / Forward-looking information

explains events and outcomes, aligns with your history, informs case studies, feeds your models with ground-truth



Expert Assessment: Past, Present Future

combines the state of the scientific understanding with robust blended and diverse data sets into easy-to-digest summaries



Front Matter

About this Report
Guide to the Report

Summary Findings

1. Overview

National Topics

2. Our Changing Climate
3. Water
4. Energy Supply, Delivery & Demand
5. Land Cover & Land-Use Change
6. Forests
7. **Ecosystems, Ecosystem Services, & Biodiversity**
8. Coastal Effects
9. Oceans & Marine Resources
10. Agriculture & Rural Communities

National Topics (cont.)

13. Air Quality
14. Human Health
15. Tribes & Indigenous Peoples
16. Climate Effects on U.S. International Interests
17. Sector Interactions, Multiple Stressors, & Complex Systems

Regions


18. Northeast
19. Southeast
20. U.S. Caribbean
21. Midwest
22. Northern Great Plains
23. Southern Great Plains
24. Northwest
25. Southwest

Responses

28. Reducing Risks Through Adaptation Actions
29. Reducing Risks Through Emissions Mitigation

Appendices

1. Report Development Process
2. Information in the Fourth National Climate Assessment
3. Data Tools & Resources
4. Looking Ahead
5. Frequently Asked Questions

NOAA National Centers for Environmental Information | State Climate Summaries 2022 150-DE

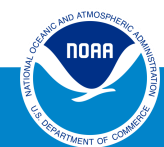

DELAWARE

Key Messages

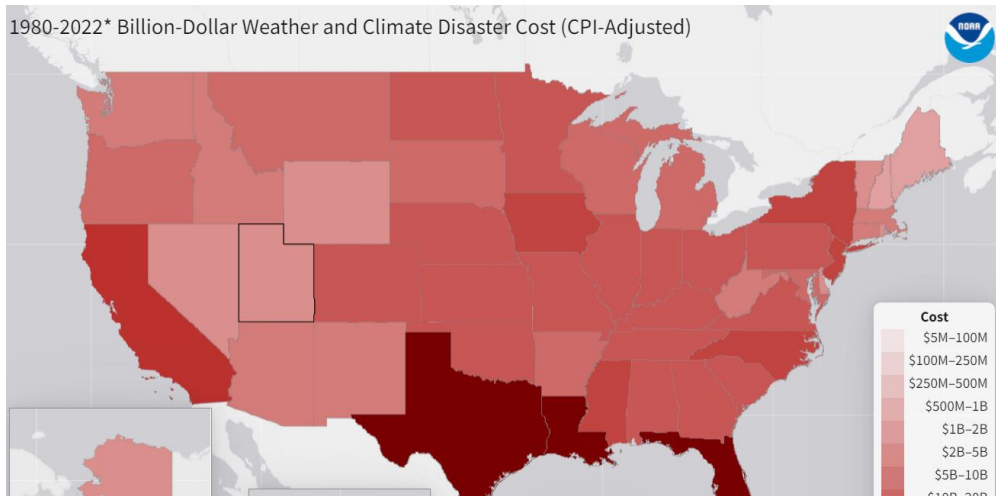
Temperatures in Delaware have risen more than 3°F since the beginning of the 20th century. Under a higher emissions pathway, historically unprecedented warming is projected during this century. Heat waves are projected to be more intense and cold waves less intense.

Precipitation is projected to increase, as are the number and intensity of extreme precipitation events.

Since 1900, global sea level has risen by about 7–8 inches and is projected to continue to rise, with a likely range of 1–4 feet. Delaware sea level rise has been higher due to land subsidence (sinking). The number of tidal floods has been increasing. The low-elevation areas of Delaware are highly vulnerable to sea level rise.



Billion Dollar Disasters & Risk



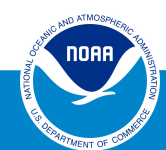
Historic Risk	S. Barbara County	California	U.S.
Drought Risk	100.00	33.35	11.61
Flooding Risk	15.38	14.18	9.13
Freeze Risk	10.57	2.71	15.72
Severe Storm Risk	6.36	8.85	16.99
Tropical Cyclone Risk	--	0.14	4.36
Wildfire Risk	37.47	28.74	6.30
Winter Storm Risk	1.72	5.91	13.71
Weather + Climate Combined Risk	57.38	26.21	13.30
Social Vulnerability Index (SoVI®)	39.18	38.53	38.35
Future Risk	S. Barbara County	California	U.S.
Agricultural Damage (% Change)	17.40%	7.46%	-11.91%
Mortality (Change in Deaths/100k)	5.54	4.17	9.16
Energy Expenditures (% Change)	-0.16%	4.50%	9.24%
High-Risk Labor (% Change)	-1.33%	-1.06%	-1.51%
Coastal Storm Damage (% GDP)	--	--	0.29%
Total Damage (% County GDP)	1.60%	2.23%	4.57%
No Vehicle (% of Households)	5.60%	--	--

Socioeconomic Vulnerabilities	S. Barbara County
Below Poverty (% of Population)	14.80%
Income (Per Capita Income)	\$34,229.00
No High School Diploma (% of Population)	19.00%
Age 65+ (% of Population)	14.60%
Age < 18 (% of Population)	22.30%
Disabled % of Population	9.90%
Single Parent Households (% of Population)	8.80%
Minority Population (% of Population)	55.10%
Limited English (% of Population)	11.00%
Mobile Homes (% of Homes)	4.40%
No Vehicle (% of Households)	5.60%

Thank You!

- We want to help the industry address its climate challenges and opportunities
- We want to help the industry understand its climate challenges and opportunities
- We want to help the folks that help the industry ...

Derek.Arndt@noaa.gov
www.ncei.noaa.gov

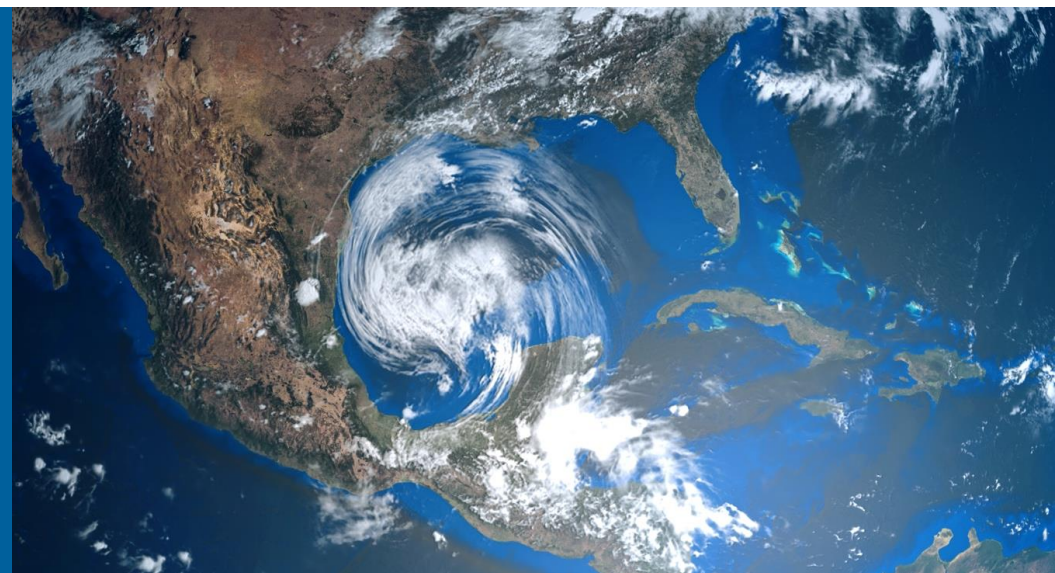


DR. THOMAS WALL

PROGRAM LEAD, ENGINEERING &
APPLIED RESILIENCE
ARGONNE NATIONAL LABORATORY



OVERVIEW: CENTER FOR CLIMATE RESILIENCE AND DECISION SCIENCE



THOMAS A. WALL, PH.D.
Program Lead, Engineering & Applied Resilience
Decision and Infrastructure Sciences Division

ARGONNE'S ROLE IN CLIMATE RESILIENCE

Center for Climate Resilience and Decision Science

- The Center for Climate Resilience and Decision Science (CCRDS) conducts research and analysis to enable unmatched climate-risk informed decision-making and adaptation planning for public and private stakeholders facing a variety of climate-related challenges around the world.
- The CCRDS is comprised of a multidisciplinary scientific team that collaborates with research partners to ensure that climate risk-informed decision-making is contextualized in socio-economic, infrastructure, environmental, and fiscal realities so that mitigation actions are grounded in science and practicable for immediate implementation.



CENTER FOR
**CLIMATE RESILIENCE
AND DECISION SCIENCE**

Argonne National Laboratory

CCRDS SPONSORED RESEARCH PROJECTS

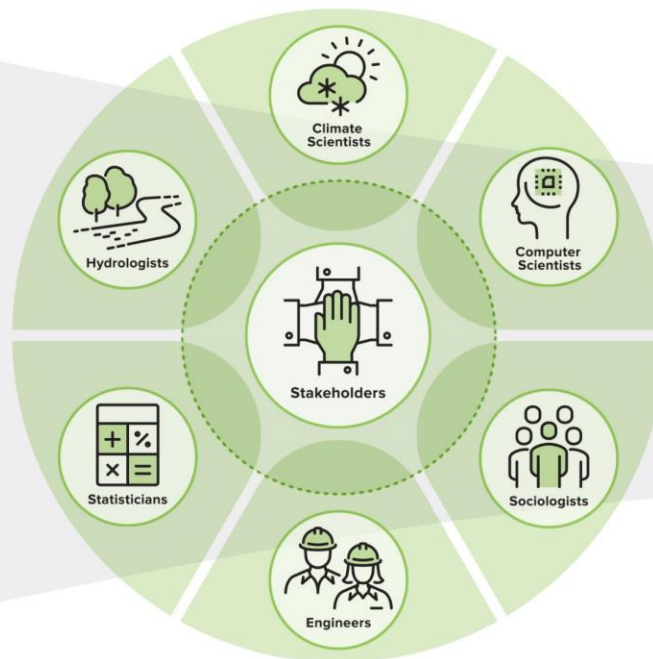
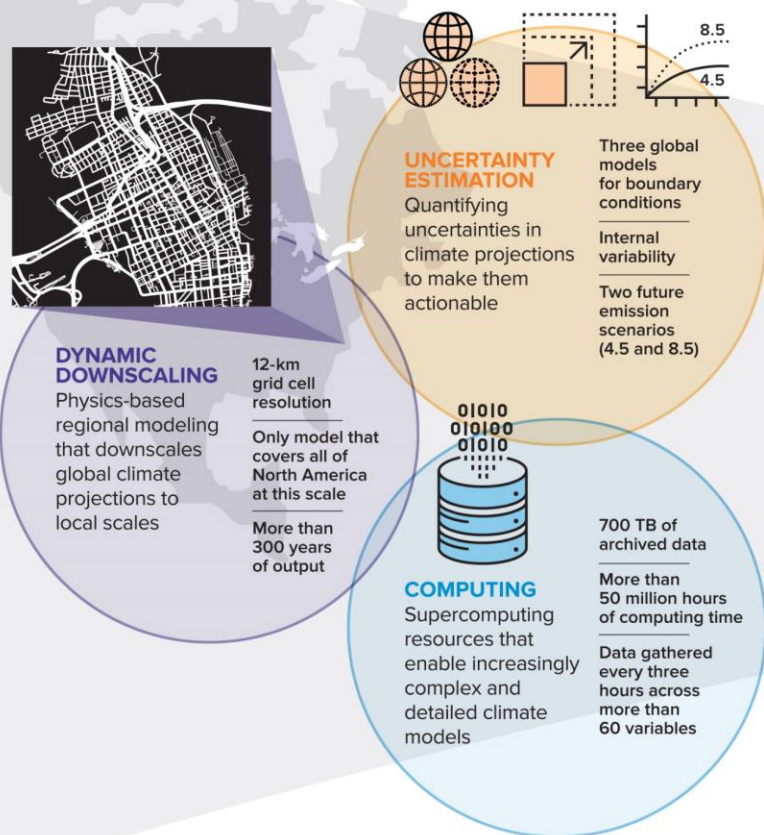


ANALYZING CLIMATE RISKS AND INFORMING DECISIONS

FOUNDATIONAL CLIMATE DATA

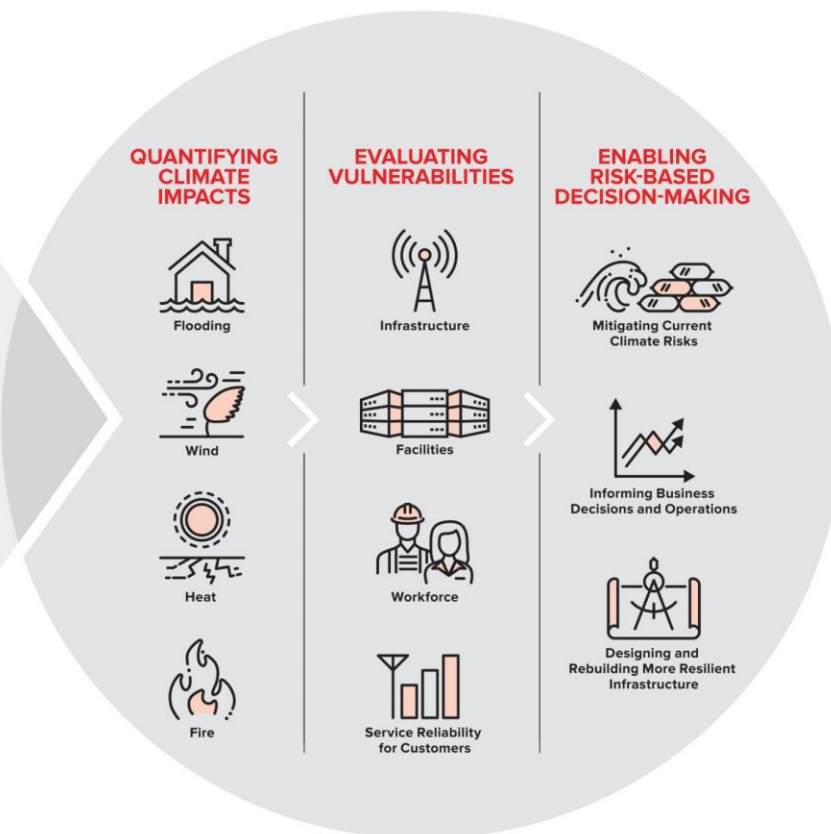
ANALYSIS AND APPLICATIONS

RISK ESTIMATES TO INFORM DECISIONS



COLLABORATION

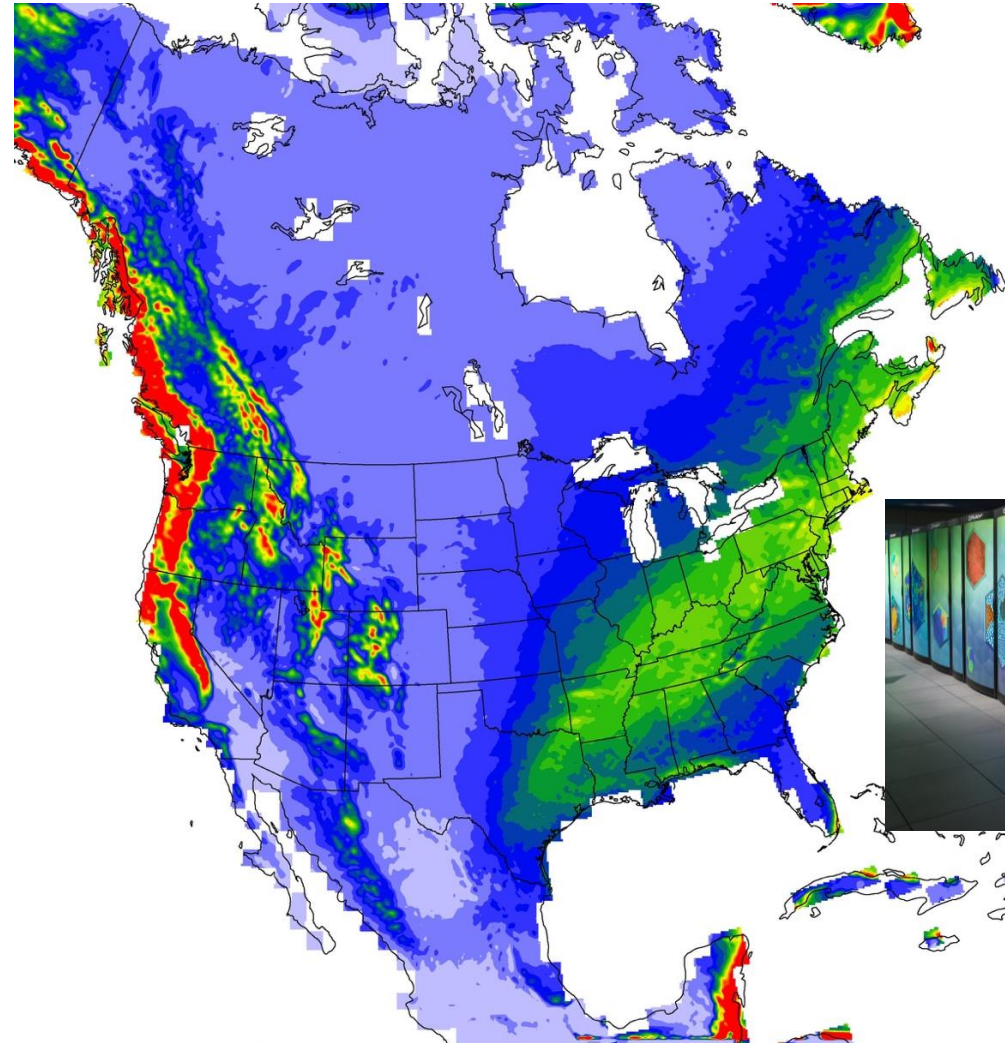
Argonne's experts form multi-disciplinary teams that work closely with stakeholders, including federal agencies, industry and local communities



LOCAL CLIMATE PROJECTIONS THROUGH DYNAMIC DOWNSCALING

ARGONNE'S DYNAMICALLY DOWNSCALED, REGIONAL CLIMATE MODELING IS A UNIQUE CLIMATE RESOURCE

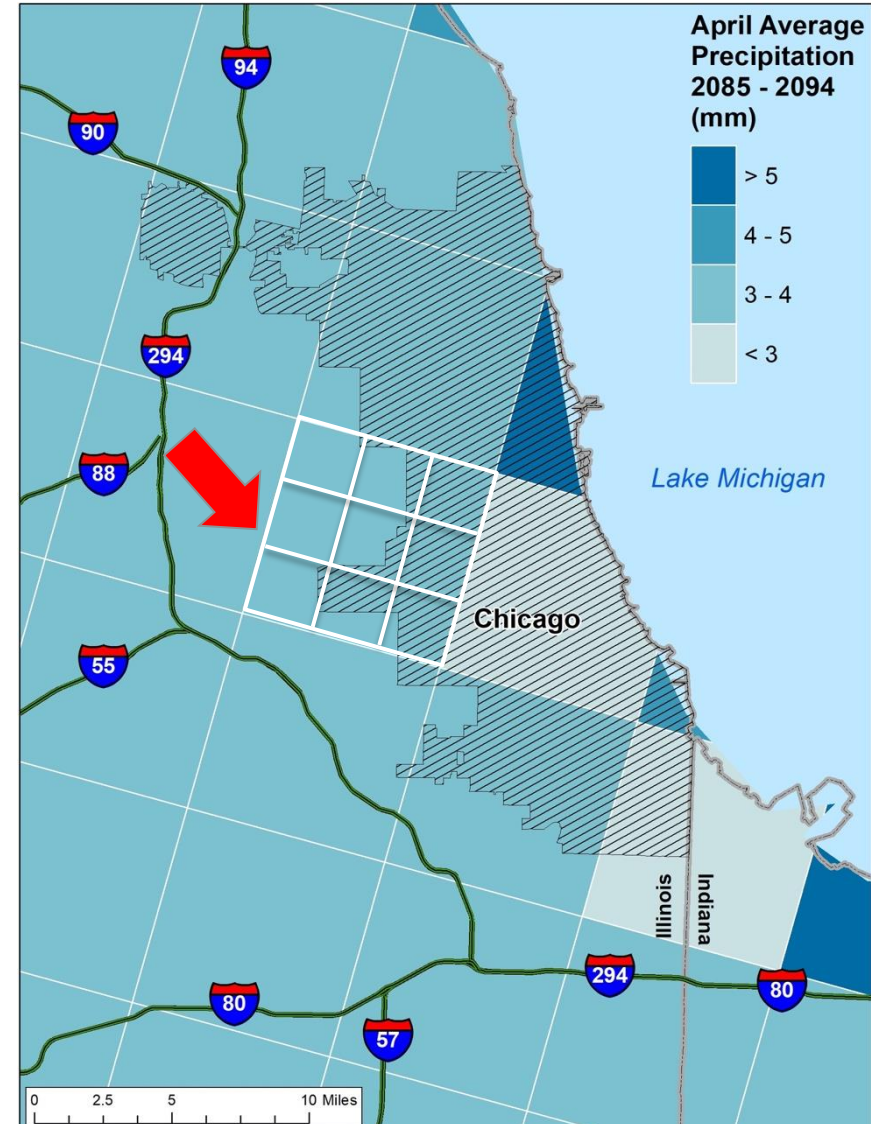
- High resolution, neighborhood level (12km)
- Scientific transparency: widely published and scientifically peer reviewed modeling and outcomes
- Dynamical downscaling offers improvements over statistical downscaling
 - Physics-based, addresses non-stationarity
 - Produces 60+ unique climate variables
- RCP8.5 (upper limit) + RCP4.5 (~Paris accords)
 - Useful for infrastructure protection and disaster planning



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EXAMPLE APPLICATION TO INFORM DECISIONS

Argonne, New York Power Authority plan for the future in a changing climate

- Enables NYPA to better assess how its ability to generate, transmit and deliver electricity may be affected by climate change.
- Using state-of-the-art climate and infrastructure system modeling techniques, and a powerful supercomputer, to identify the risks.
- The study will help NYPA plan investments in its infrastructure and strengthen its resilience against climate change.



THANK YOU



CENTER FOR
**CLIMATE RESILIENCE
AND DECISION SCIENCE**
Argonne National Laboratory



U.S. DEPARTMENT OF
ENERGY

Argonne National Laboratory is a
U.S. Department of Energy laboratory
managed by UChicago Argonne, LLC.

Argonne 
NATIONAL LABORATORY



JESSICA FILANTE

DIRECTOR, GLOBAL ENVIRONMENTAL
SUSTAINABILITY

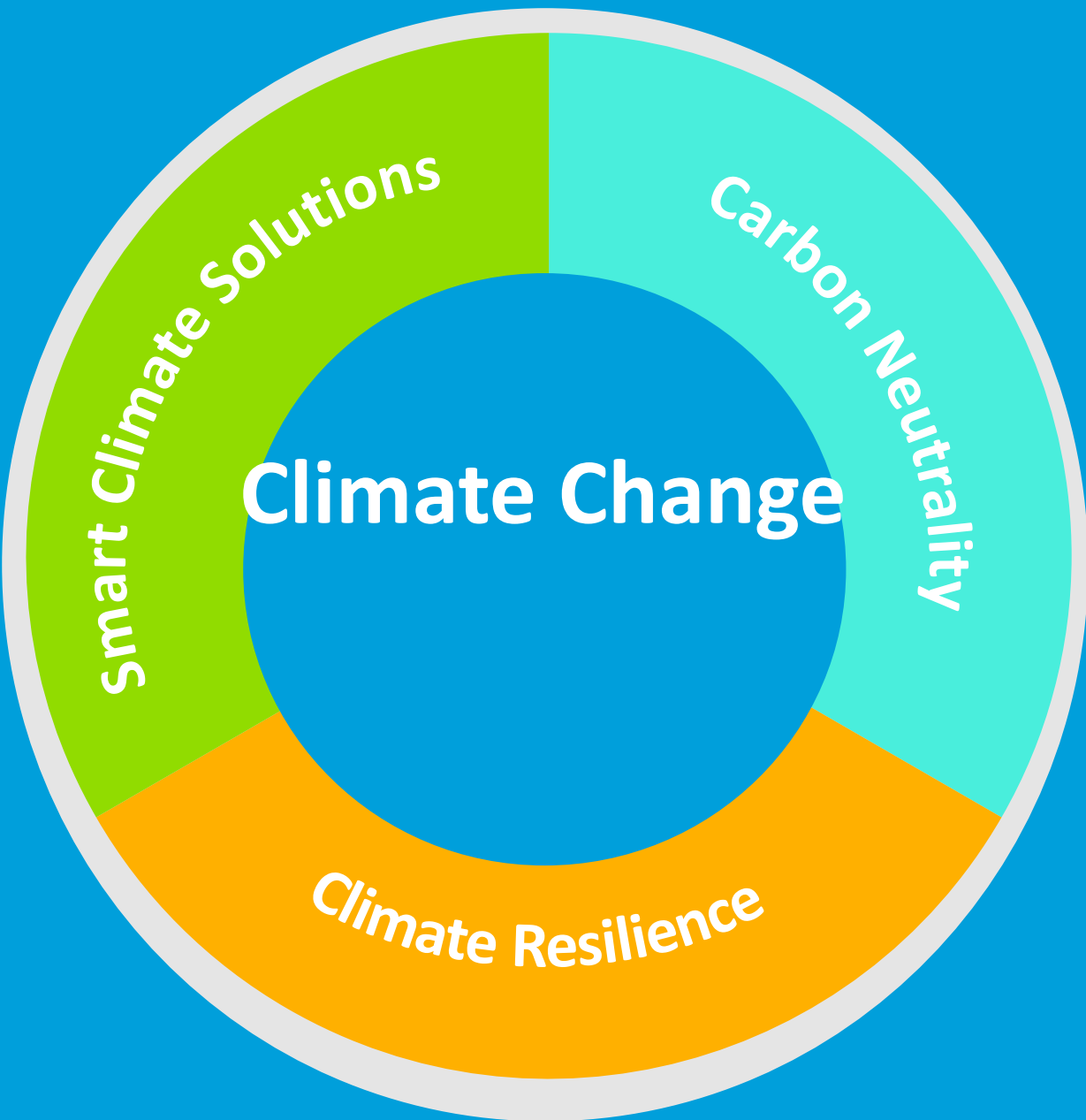
AT&T

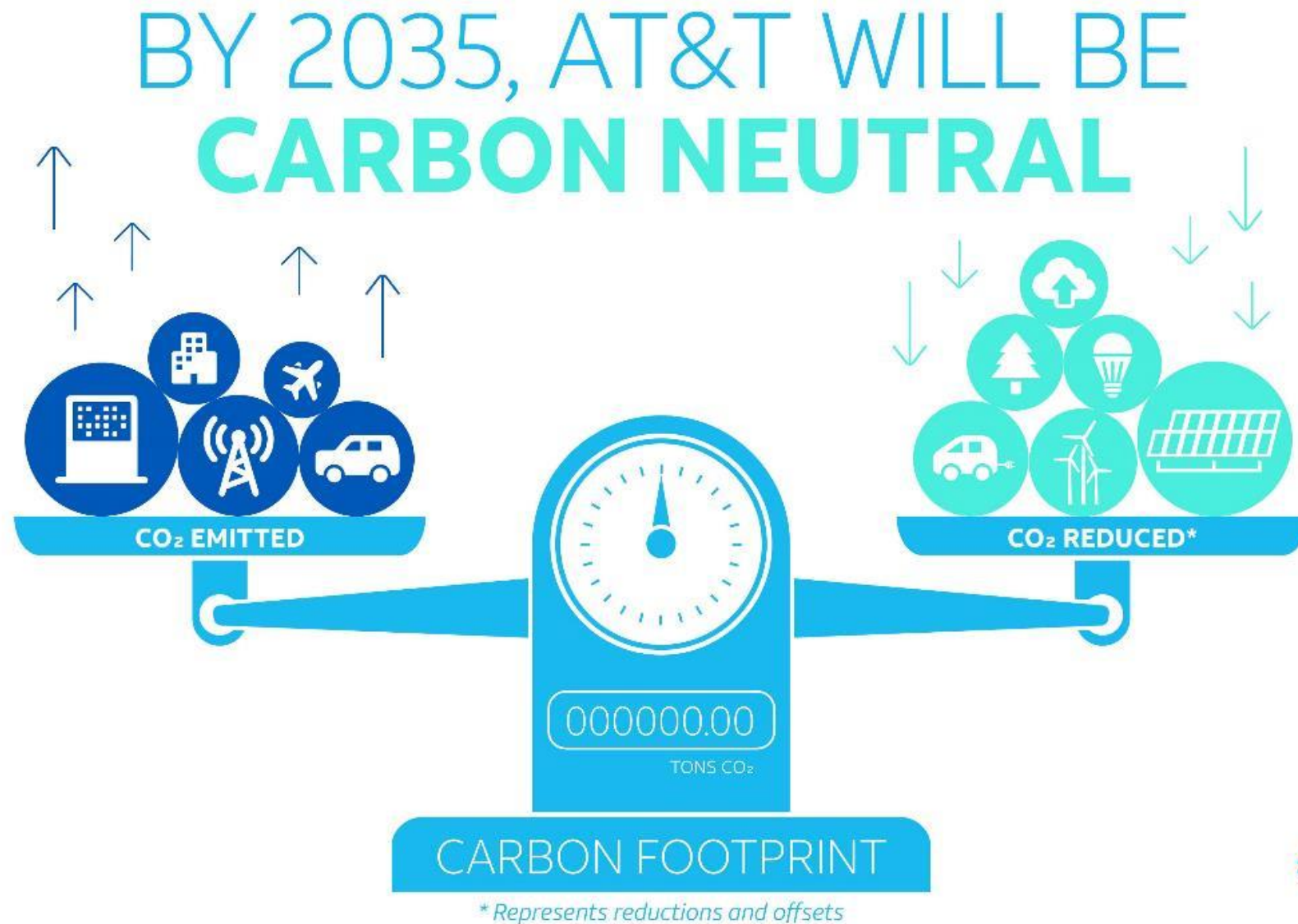


AT&T Corporate Social Responsibility

AT&T Climate Action







Science-based target (SBT) of 1.5 degrees by 2030
Supply Chain SBT goal 50% by 2024

AT&T's Smart Climate Solutions help business customers reduce carbon emissions

Our goal is to
reduce global
emissions by one
gigaton by 2035.



Preparing Our Infrastructure and Our Communities



AT&T's Approach to Manage Physical Risk to Infrastructure and Network Performance

Background

Several years ago, the CSR organization collaborated with Argonne National Lab to generate climate data that help us visualize **how climate change will affect our network and operations** out to mid-century. Using this data, we can take steps to **prepare our infrastructure** to withstand more frequent and severe extreme weather.

Climate Data Helps Us Capture Risk Posed By

- Inland flood depths (Precipitation-based)
- Coastal flood depths (Storm Surge & Sea level rise)
- Wind Speeds
- Drought
- Wildfire

Differentiated Data Set

- Forward-looking data (most use historical FEMA data that doesn't incorporate sea level rise, temp changes and other climate factors)
- High resolution (data is downscaled to neighborhood level)
- Integrating into network planning and maintenance software so engineers can make better decisions
- Based on worst case scenario

MANI BALAKRISHNAN

DIRECTOR OF SUSTAINABILITY AND
SOCIAL RESPONSIBILITY
ZEBRA TECHNOLOGIES



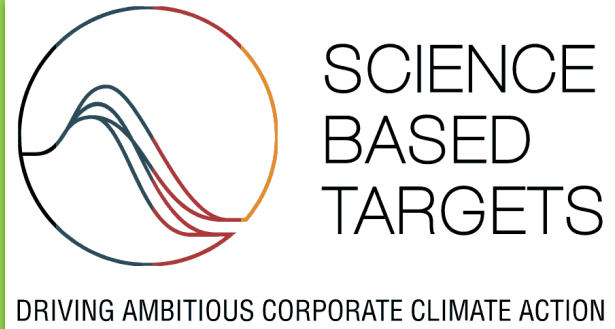


Environmental Social Governance

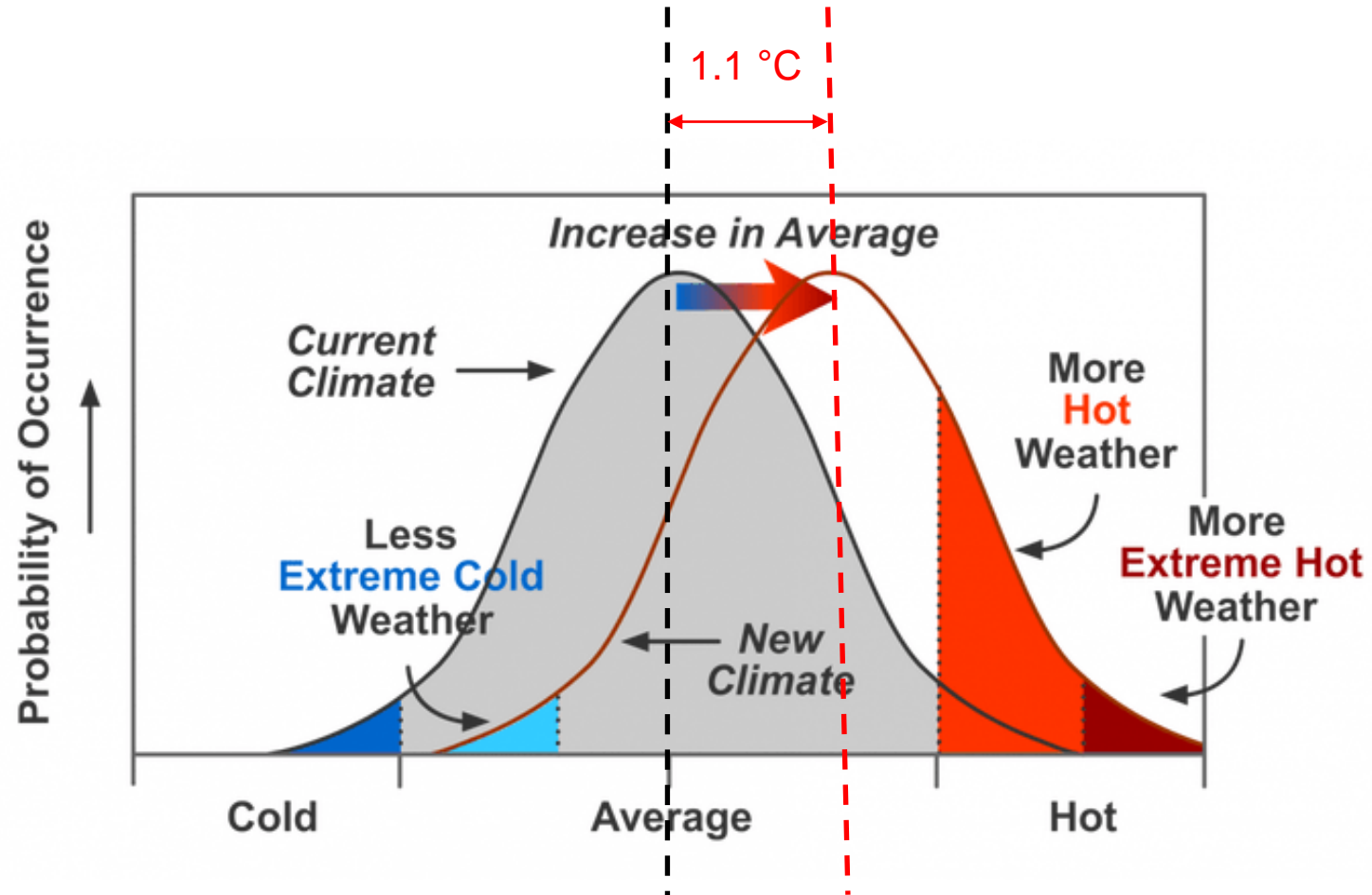
Inclusive | Innovative | Impactful

Climate Scenario Analysis 2022 RILA Climate Conference

Mani Balakrishnan
Director Sustainability and Social Responsibility



Global Warming and Extreme Events



Source: Intergovernmental Panel on Climate Change (IPCC)

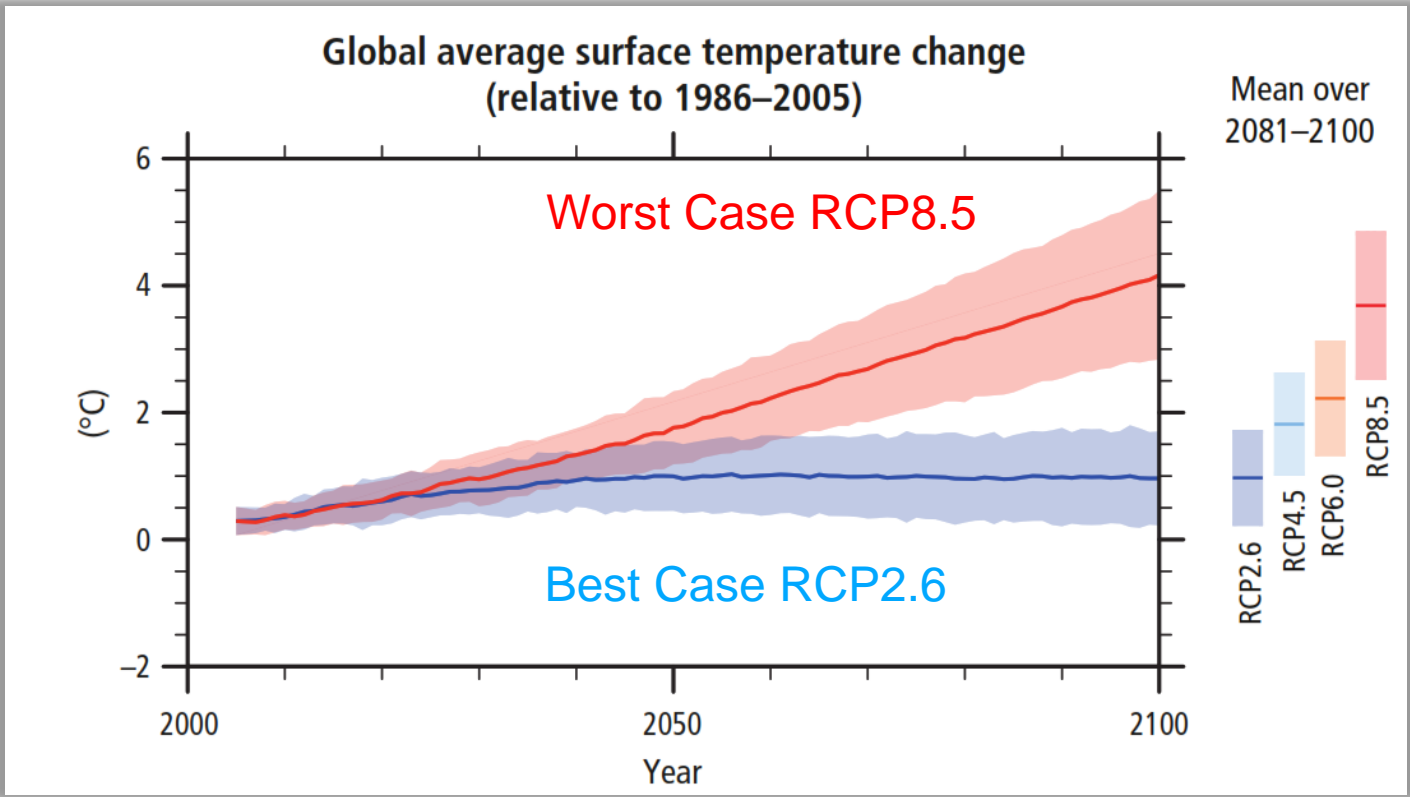
A slight increase in mean earth temperature causes an exponential increase in the risk of extreme weather events

IPCC Guidance

Hazard, Exposure and Vulnerability to characterize climate risks

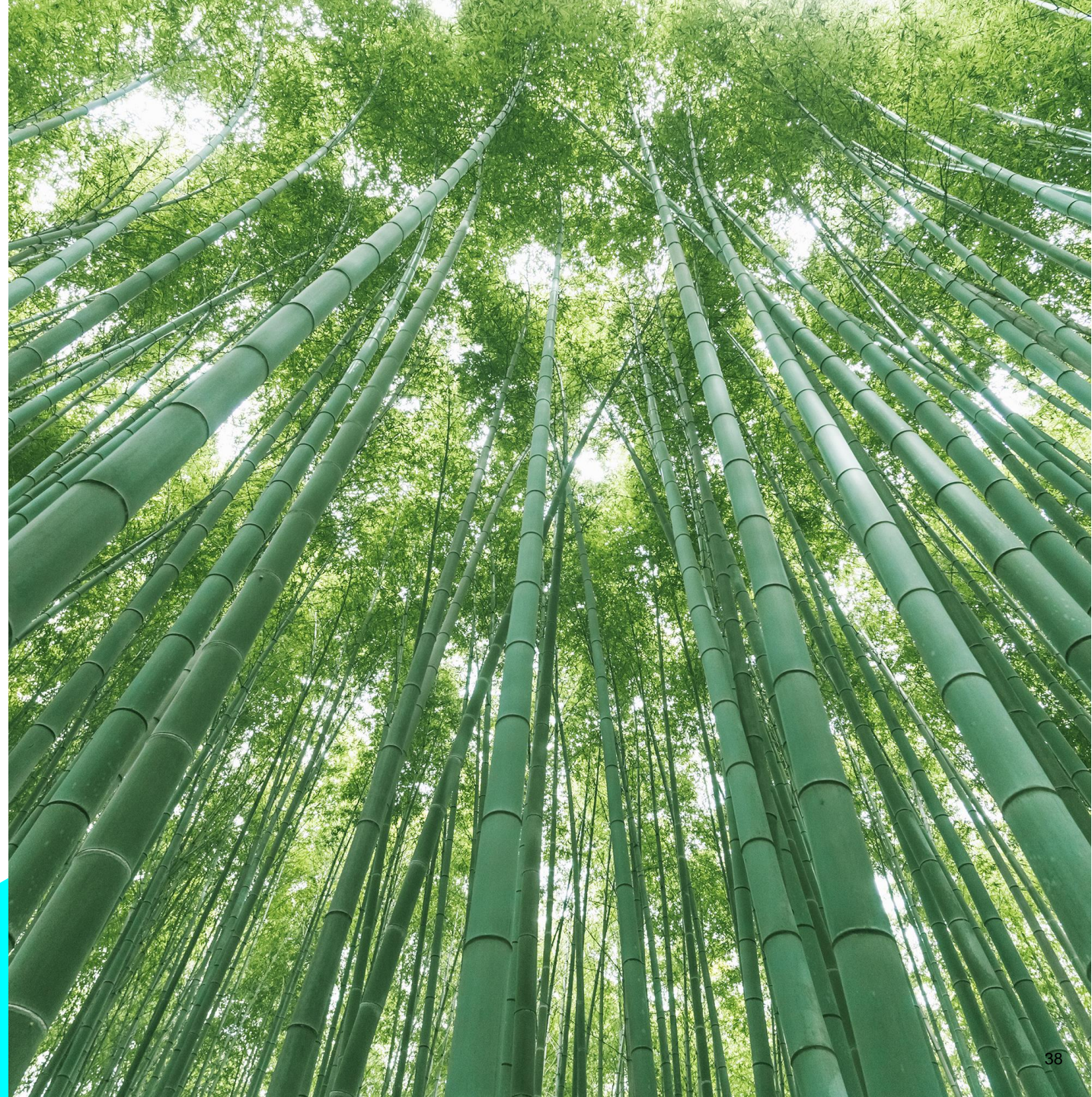
Scenarios: Projected increase of global mean surface temperature by the end of the 21st century (2081-2100) relative to 1986-2005

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



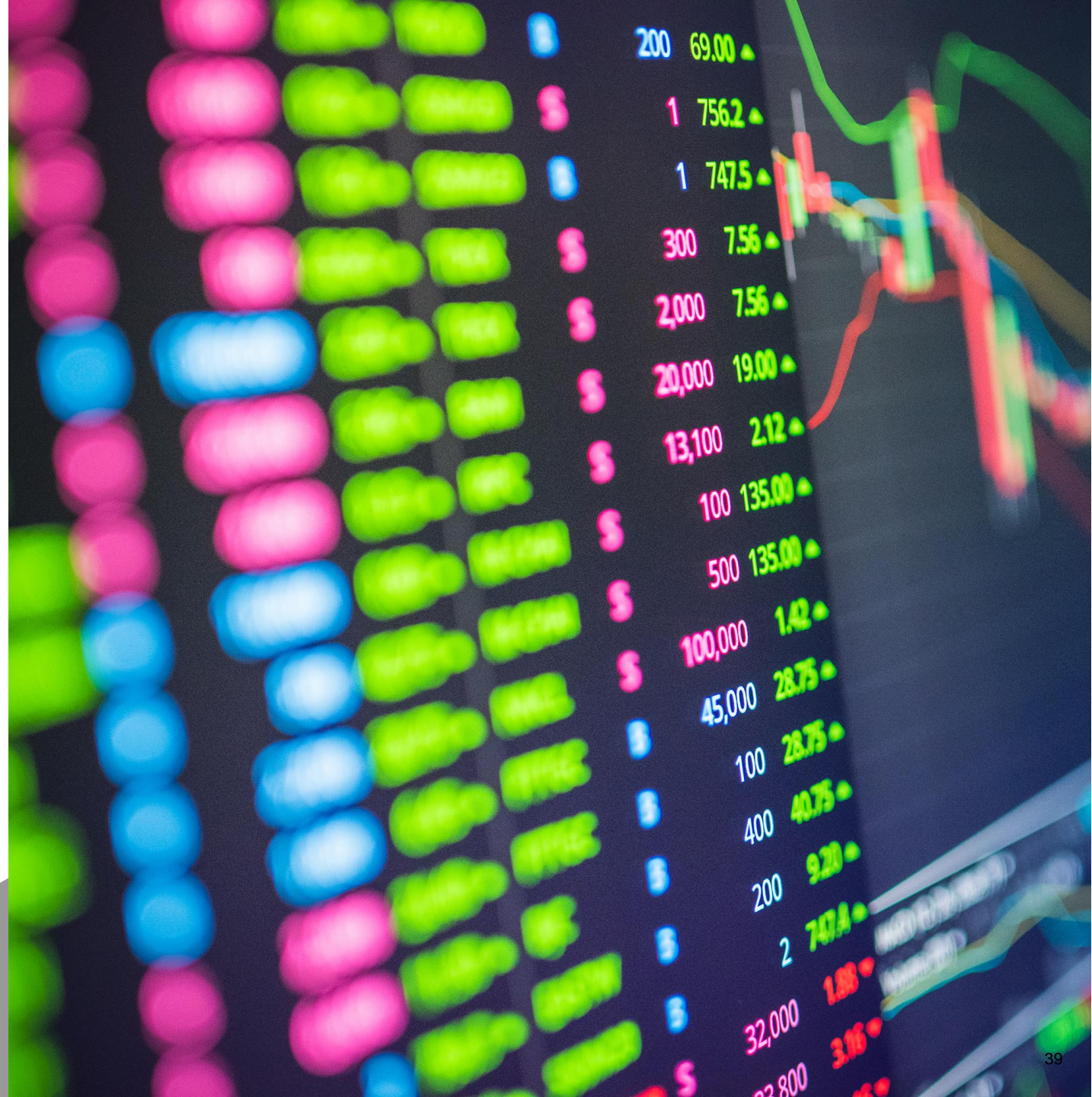
Stakeholder Expectations

- Robust public disclosure
 - Qualitative and Quantitative
 - Defensible assumptions
 - Company-wide scope
- Raise climate risk awareness across the company
 - Balance trade-offs between emissions reduction activities and emissions increasing activities



Current State of Climate Scenario Analysis

- Climate risk tools
- TCFD disclosures
- Climate data considerations



Zebra's Risk Characterization

- Overall approach
- Identify the top climate risks
 - Flooding was our predominant risk
 - Combined climate effects important in the longer term
- Risk Characterization
 - Flood return period, business importance, and site elevation as proxies for hazard, exposure, and vulnerability
 - Consistent scoring methodology

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			

Improvised along the way!

- Complex Electronics Supply Chain
 - Prioritized indirect suppliers with single and sole source dependencies aggregated by watershed
 - Assessed each watershed when characterizing risks
- Top 10 customer areas by revenue
 - Used distributor point of sale location data

Zebra Footprint Watershed
177 Southeastern China/Taiwan
176 China Yangtze River/Shanghai
173 North Coastal China/Japan/Korea
179 Thai/Malaysia/Singapore
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
366 Australia - Victoria
357 US Texas Gulf Basin
361 Central America

Climate climate risks under the best and worse case scenarios

Overall Risk Level					
1 (Low)		4 (Moderate)		7 (High)	
2 (Low)		5 (Moderate)		8 (High)	10
3 (Low)		6 (Moderate)		9 (High)	

Zebra Footprint Watershed	Zebra-Operated Locations						Third Party Locations					
	Engineering		Operations		Warehousing		Warehousing		Supplier - Direct		Suppliers - Indirect	
	2 C	4 C	2 C	4 C	2 C	4 C	2 C	4 C	2 C	4 C	2 C	4 C
079 Western Europe												
104 Southern India												
173 N. Coastal China/Japan/Korea												
174 China Jiangsu/Shandong												
176 China Yangtze River Basin												
177 Southeastern China/Taiwan												
178 Vietnam Mekong Basin												
179 Thai/Malaysia/Singapore												
257 Brazil Parana River Basin												
282 US Pacific Northwest												
283 US Columbia River Basin												
331 Canada Lake Ontario												
333 US Upper Mississippi Basin												
339 US Atlantic Northeast												
341 US Atlantic Southeast												
350 US Arkansas												
355 US Upper Missouri Basin												
357 US Texas Gulf Basin												
358 US/Mexico Rio Grande Basin												
359 Central Mexico												
361 Central America												
365 US Pacific Central												
366 Australia Victoria												
370 Indonesia												
372 Philippines Manilla												

Closing Thoughts

- Dealing with data uncertainties
- Robust public climate risk disclosure avoids the need to fill out separate risk survey investor requests on scenario analysis, each with a different methodology
- Thank you to DOE Better Climate Initiative and Argonne Labs

Zebra's Sustainability Website



[Sustainability Accounting Standards Board \(SASB\) Reporting](#)

[CDP \(Carbon Disclosure Project\) Reporting](#)

[External Verification Of Zebra's Carbon Emissions](#)

[Climate Risk Characterization And Scenario Analysis](#)

Q&A

OPEN DISCUSSION

LIVE POLL RESULTS

*Note for live polls, the survey results represent a “snapshot in time” of some RILA member companies’ policies and activities related to the topics covered by this survey as well as the responses of other, non-retail company representative webinar attendees. Not all RILA member companies participated in the survey and more than one representative from a company may have responded. Therefore, the survey results do not represent a complete picture of the policies and activities of the whole RILA membership or the retail industry on these issues.

POLL RESULTS

Poll 1: Has your company experienced major disruptions to its operations due to natural disasters this year?

1. Yes - **57%**
2. No - **43%**

Poll 2: What facilities are of highest concern for your organization to maintain electricity access/resiliency? Select all that apply.

1. None of these - **0%**
2. Not sure - **0%**
3. N/A - **5%**
4. Stores - **74%**
5. Distribution/fulfillment centers - **68%**
6. Offices - **32%**
7. Manufacturing facilities - **32%**
8. Other (share in chat)

POLL RESULTS

Poll 3: Which if any are part of your company's preparedness efforts to support employees in regions being hit with a natural disaster event? Select all that apply.

1. None of these - **7%**
2. Not sure - **36%**
3. N/A - **7%**
4. Alerts - **50%**
5. Access to resources - **50%**
6. Emergency transportation - **0%**
7. Prep facilities for overnight stays - **21%**
8. Other (share in chat)

Poll 4: What long-term preparedness measures has your company explored? Select all that apply.

1. None of these - **10%**
2. Not sure - **30%**
3. N/A - **10%**
4. Floodgates - **5%**
5. Backup power - **50%**
6. Microgrids - **5%**
7. Load minimization - **5%**
8. Other (share in chat)

POLL RESULTS

Poll 5: Has your company conducted a climate scenario analysis?

1. No - **53%**
2. Not sure - **6%**
3. N/A - **12%**
4. Yes, for domestic operations - **6%**
5. Yes, for international operations - **0%**
6. Yes, for both domestic and international operations - **24%**

Poll 6: How does your organization make the business case to analyze climate and/or weather data? Select all that apply.

1. Not sure - **27%**
2. N/A - **20%**
3. We do not have a process for estimating this business case - **27%**
4. Estimate avoided LP/AP costs - **20%**
5. Estimate avoided supply chain/sourcing disruption costs - **33%**
6. Estimate increased sales (e.g., seasonal, weather or climate event-specific) - **20%**
7. Estimate community impact - **13%**
8. Estimate PR impact – **13%**
9. Improved investor relations - **20%**
10. Other (share in chat)

POLL RESULTS

Poll 7: The future climate impacts of greatest concern to my organization are... Select all that apply:

1. Extreme high temperatures - **67%**
2. Extreme low temperatures - **44%**
3. High winds - **33%**
4. Heavy rains - **44%**
5. Coastal flooding - **78%**
6. Inland/river flooding - **67%**
7. Hurricanes - **67%**
8. Other – Share in chat

Poll 8: The region of the world I'm most concerned about future climate change impacting my business and/or supply chains are ... Select all that apply:

1. United States - **38%**
2. North America - **63%**
3. South/Central America - **38%**
4. Europe - **13%**
5. Africa - **25%**
6. SE Asia - **38%**
7. South Asia - **75%**
8. Australia/Oceania - **0%**
9. Other – Share in chat

POLL RESULTS

Poll 9: Has your company used NOAA or Argonne climate data and information or tools?

Select all that apply.

1. No - **43%**
2. Not sure - **14%**
3. N/A - **29%**
4. Yes, for weather/natural disaster preparedness only - **14%**
5. Yes, for strategic planning including resiliency planning - **14%**
6. Yes, for climate risk mapping and/or business scenario planning - **14%**
7. Other – Share in chat