

# Data-Driven Planning for Telecom Infrastructure Under Climate-Related Uncertainty

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# Building Climate Resilience through Forward-Looking Data

**What** | Assess the physical risk climate change poses to AT&T's business

**How** |



## Visualize data

Leveraging forward-looking climate projections to see changes in flooding, wildfire, wind, drought and temperature.



## Assess vulnerabilities

Identifying critical assets and assessing their vulnerability to climate hazards.



## Take Action

Enhance infrastructure, fireproof equipment, put in flood gates, etc.

**Why** |

## Reporting/Regulation Requirements

- > Top institutional investors request companies report to the **Task Force on Climate-Related Financial Disclosures (TCFD)** framework, which requires companies complete a climate scenario analysis.
- > **U.S. Security Exchange Commission** issued proposed rule on climate that requests company's evaluate potential climate risks.

## Financial Value

- > CDP estimates that **\$4 trillion** worth of assets will **be at risk** from climate change by 2030 globally
- > Knowing your company's risks helps you plan today to reduce costs tomorrow.
- > Opportunity to **reduce insurance costs** if able to show quantified risks and mitigation plans.

## Customer Considerations

- > Planning helps to **minimize disruptions** to customers.
- > Avoid **reputational** challenges associated with climate-related disruptions.
- > **Customers** looking to purchase from companies that are working to address environmental and social issues like climate change.

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

## OVERVIEW

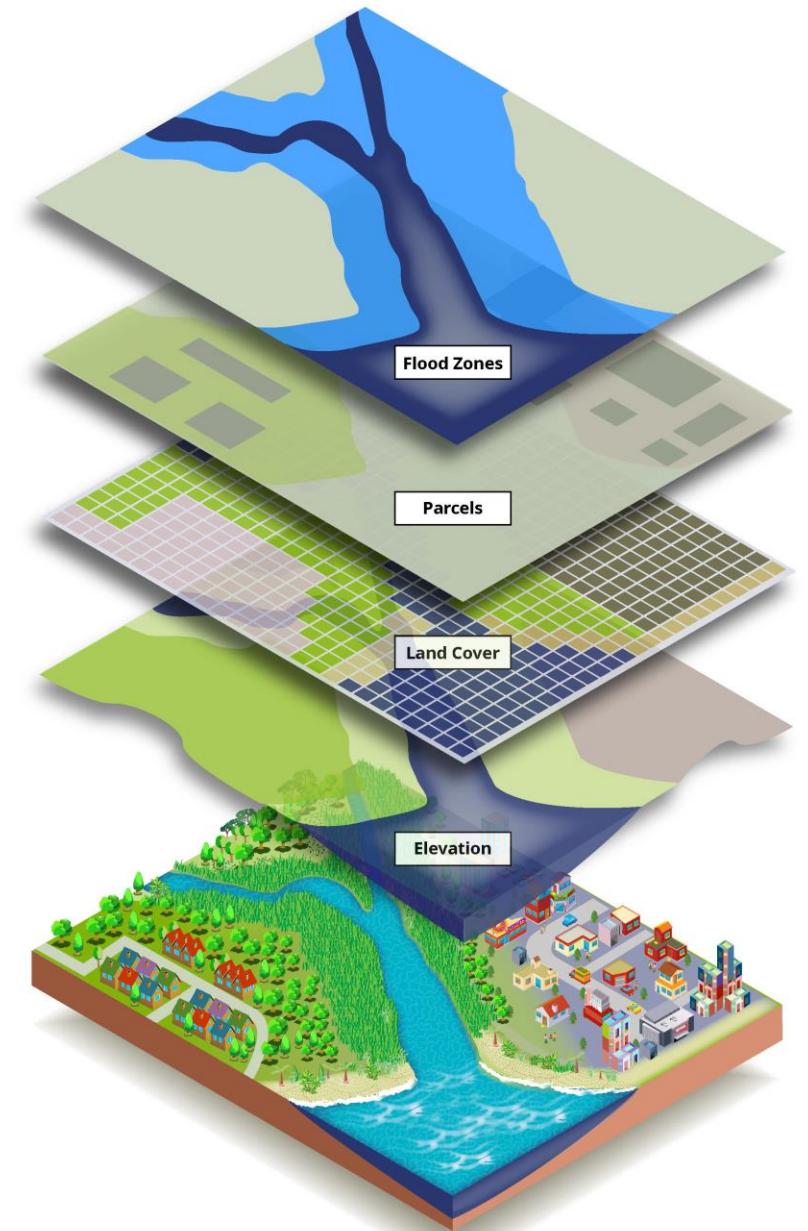
Several years ago, AT&T collaborated with Argonne National Labs to generate climate data that help us visualize **how climate change will affect our network and operations** out to mid-century. Using this data, we can take steps to **prepare our infrastructure** to withstand more frequent and severe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

## CLIMATE DATA HELPS US CAPTURE RISKS POSED BY

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

## COMPETITIVE ADVANTAGE OF DATASET

- **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)
- Renders **worst case climate scenario**



# AT&T's collaboration with Argonne and FEMA to help build a more climate resilient country



FEMA



AT&T

Argonne  
NATIONAL LABORATORY



## **AT&T, FEMA & Argonne National Laboratory Collaborate to Launch Climate Risk and Resilience Portal for U.S. Communities**

*New portal is aligned with the  
Biden Administration's efforts to  
address the climate crisis and  
make communities across America  
more resilient to climate change*



# Fortifying the Past

## CRITICAL NETWORK INFRASTRUCTURE

- Leverage climate data and historical data to understand risk
- Prioritize most vulnerable network assets with largest impact

## RESULTS

- Flood gate installation
- Electrical equipment upgrades
- Backup power upgrades
- Maintenance and inspection routine adjustments



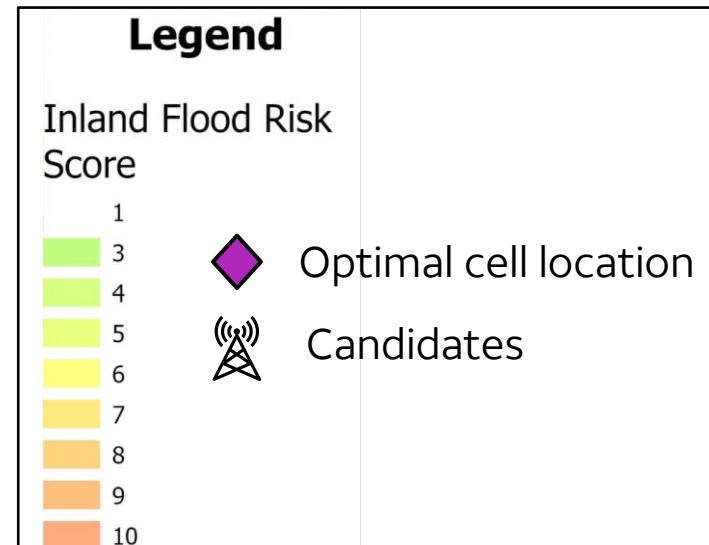
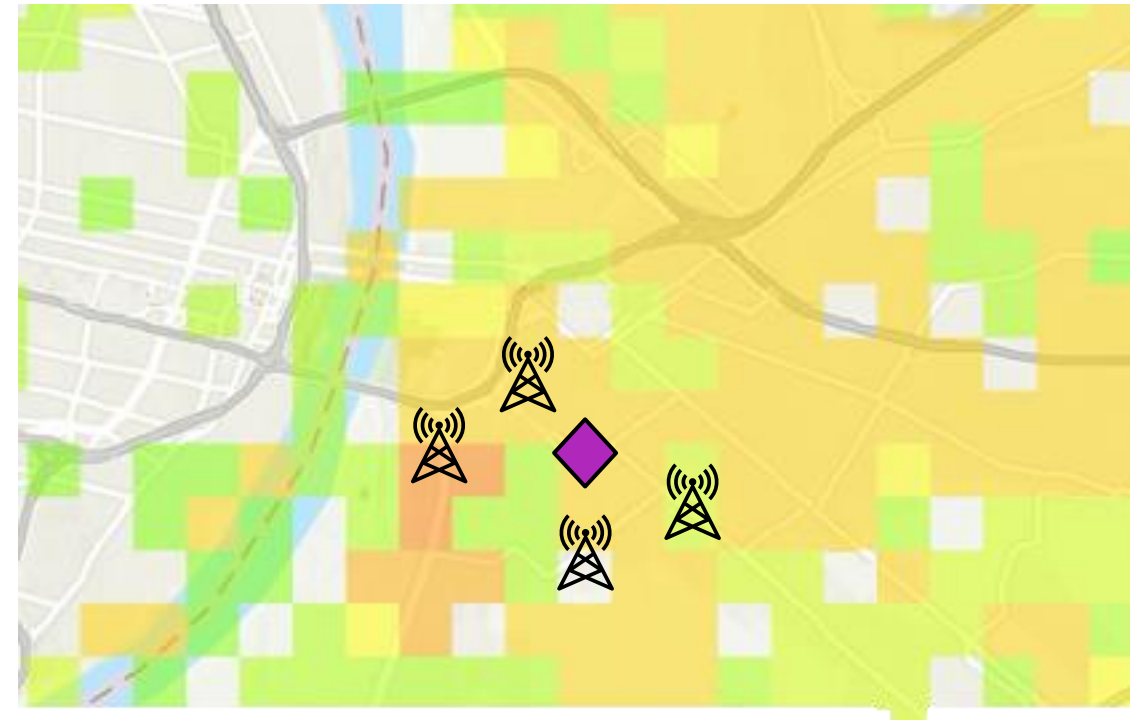
# AT&T's Resilient Future

## MOBILITY & WIRELINE PLANNING

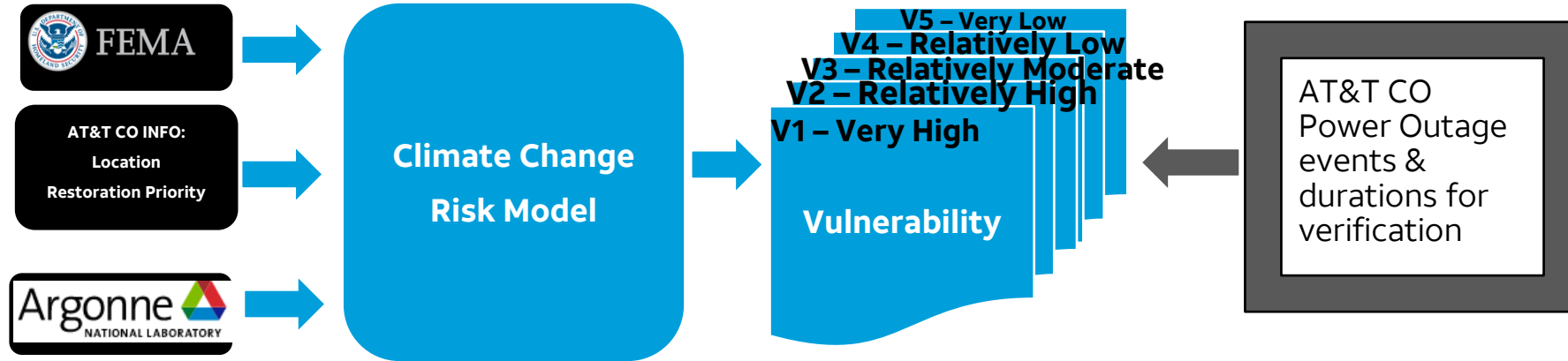
- Climate informed decision making baked into workflows
- Identify optimal locations for new infrastructure builds
- Understand what risk are present during design engineering phase
- Plan for specific risk

## RESULTS

- Buried vs. aerial fiber installations
- Elevated equipment
- Backup power selection
- Low vs. high-risk location selection
- Reduced downtime expected
- Faster restoration expected
- Cost effective



# AT&T Climate Change Risk Model For Central Offices Resiliency Measures and Restoration Priority



$$\text{Expected Building Annual Loss} = \sum_{CT} \sum_{HT} \text{Expected Annual Loss}_{CT, HT}^{CT} + \sum_{CT} \sum_{FT} \text{Exposure}_{CT}^{CT} \times \text{Annualized Frequency}_{FT} \times \text{Historic Loss Ratio}_{FT}^{CT}$$

Applying **FEMA** Location-Based Hazard Data@ Census Tract level

**Flooding Type (FT):** Coastal Flooding, Riverine Flooding (improving to latitude/longitude level)

**Hazard Type (HT):** Cold Wave, Earthquake, Hail, Heat Wave, Hurricane, Ice Storm, Landslide, Lightning, Strong Wind, Tornado, Tsunami, Volcanic Activity, Wildfire, Winter Weather, Avalanche

**Consequence Type (CT):** Building

**Exposure<sup>CT</sup>:** Building Value

Incorporate with **Argonne** National Lab. forward-looking Climate Change data

Integrated FEMA historical flood data with Argonne climate modeling

- Coastal Flooding
- Inland Flooding

AT&T Central Offices

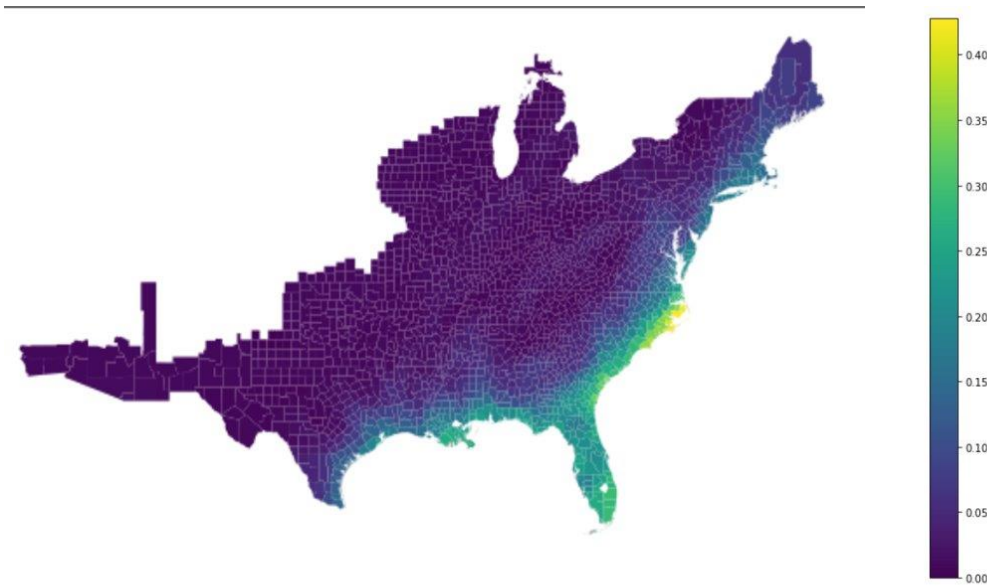
- Location information
- Restoration Priority

Model output: Vulnerability on Expected Building Annual Loss value

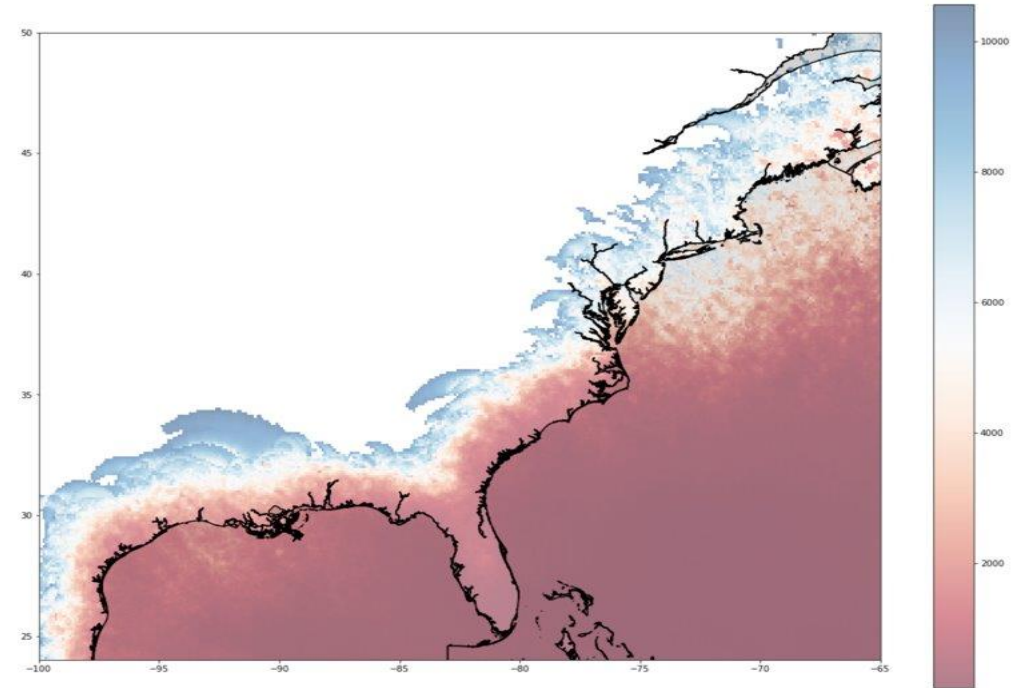
On **FEMA NRI 2023 version**

	V1	V2	V3	V4	V5
RP1	#	#	#	#	#
RP2	#	#	#	#	#
RP3	#	#	#	#	#
RP4	#	#	#	#	#

# Planning for Changing Hurricane Patterns on the US East / Gulf Coast



Historic: FEMA Annualized Frequency Map



Future: STORM Return Periods at 50 m/s [1]

- Spatial distributions of hurricane events over the US East / Gulf Coast aren't predicted to change significantly over the next 30 years
- We can maintain our current planning / processes in this case

[1] [Bloemendaal et al., 2022](#) A globally consistent local-scale assessment of future tropical cyclone risk *Sci. Adv.*, 8 (17) (2022)





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