Climate Change Study Update

June 2023

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National Grid is conducting systematic multi-decade vulnerability assessment to understand the impact climate change will have on our electric network.

Our goals are to:

- Understand the vulnerability of the millions of installed assets
- Develop optimized hardening plans
- Avoid premature repair and replacement
- Create a sustainable future for our electric network

NOTE: We are planning to complete our initial assessment in the Fall 2023. While some of the initial findings will be incorporated into the first ESMP filing, more findings are expected in subsequent ESMP filings.

We are undertaking a Climate Vulnerability Assessment to understand future risks we can plan for today.

Key Highlights

- Risk-based approach to identify assets having physically vulnerability to climate hazards
- Focused on assets critical to the delivery of electricity to our customers
- Accounts for existing hardening programs
- Provides output to inform adaptation plans

Process

- **Scope** – Validate the climate science/models, climate hazards, and assets to be included
- **Assess** – Understand the climate vulnerability risk for each asset where:

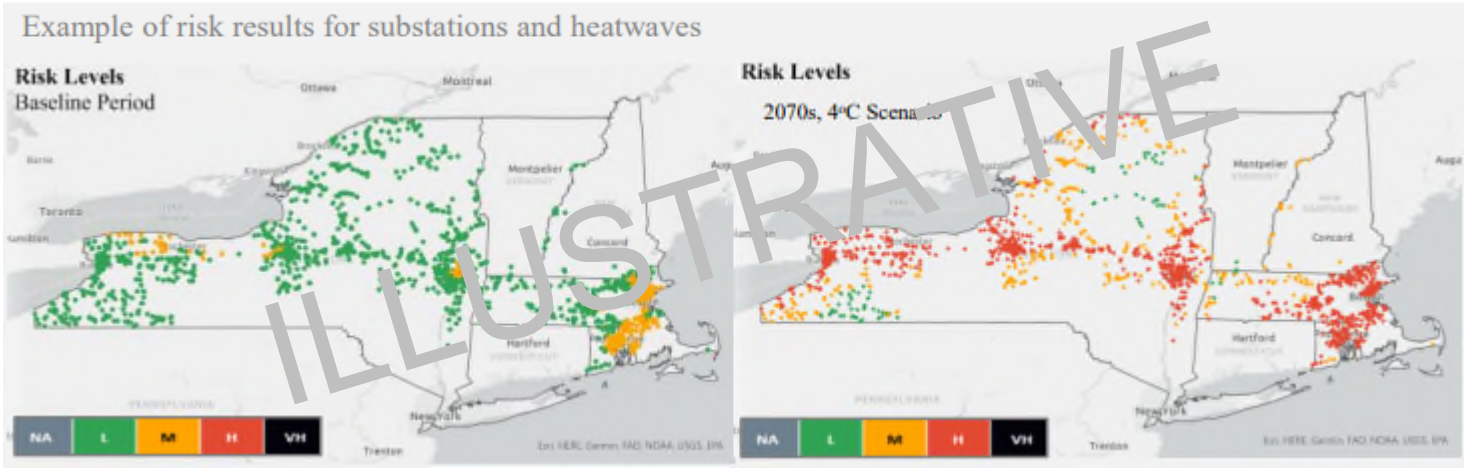
  Climate Vulnerability Risk = Exposure x Potential x Hazard

- **Adapt** - Develop actions to mitigate the climate vulnerability risk while accounting for existing hardening programs

We have developed an industry leading Climate Change Risk Tool (CCRT) to undertake this assessment.

The CCRT is a consistent, long-term assessment of physical climate change risks to assets under 2deg C and 4deg C climate scenarios using the latest climate science developed in conjunction with business unit subject matter experts. It supports our mandatory response to TCFD (Task Force on Climate-related Financial Disclosures) and provides a consistent methodology to evaluate risk to meet increasing regulatory requirements and scrutiny.

The CCRT converts scientific climate data into a platform that provide visualization of the physical impacts to our installed asset base. It accounts for regional variations in climate science to aide in local decision-making.



Our initial findings have identified ambient temperatures increases, coastal flooding, high winds, and icing will be the most impactful hazards.

A few additional notes:

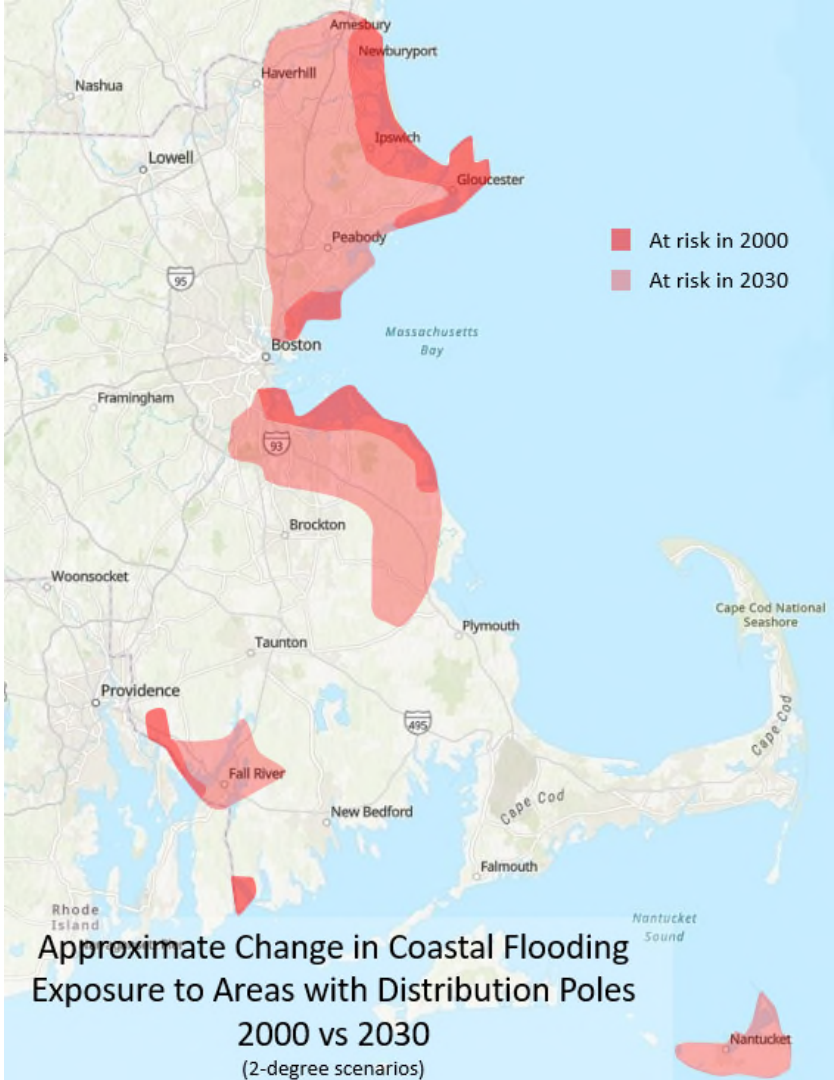
- Climate projections have a level of uncertainty and can shift based on global mitigation efforts
- For our initial assessment, we focused on the ‘2 degree’ scenario which is considered an ‘intermediate scenario’ with global warming increases ranging between 1.1˚ C and 2.6˚ C by 2100
- Wildfire risk has been identified as a hazard to be explored further to better understand the risk level.

Coastal Flooding

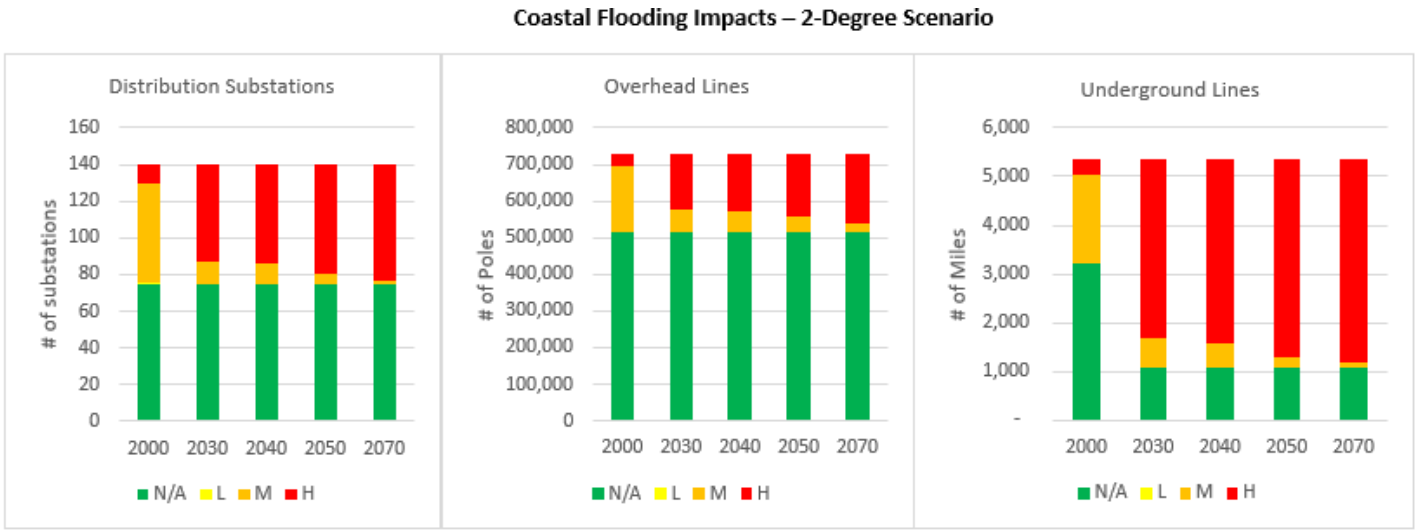
The exposure to coastal flooding expands to assets located further inland considering the projections of sea level rise and more significant storm surges.

Coastal flooding can significantly impact substation equipment, overhead distribution line structures and above-grade components of underground distribution line systems, resulting in both physical and electrical failure as well as accelerated corrosion.

It should be noted we have had a significant focus on flood mitigation risk through our past and ongoing substation flood projects as well as the implementation of Coastal Design Standard.



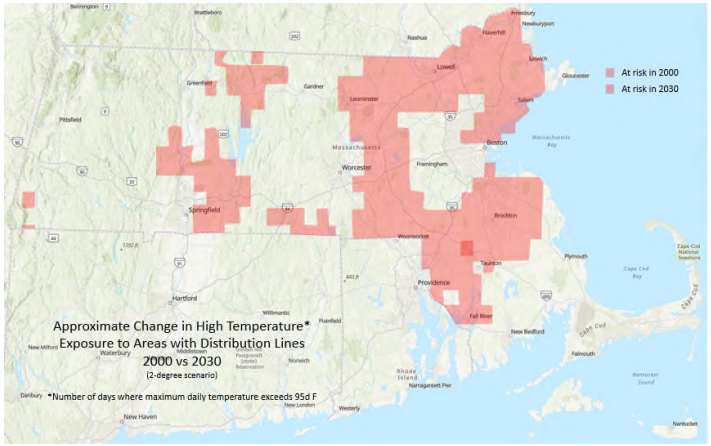
Coastal Flooding: Approximate Projected Asset Impacts

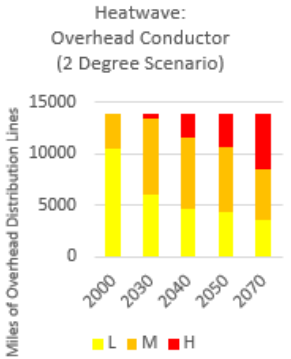


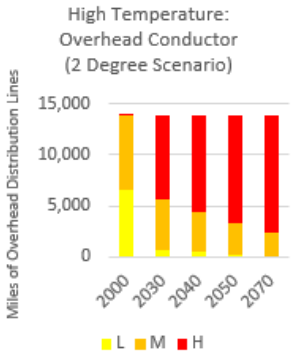
High Temperature & Wildfires

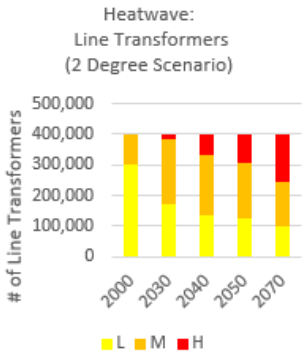
Increases in ambient temperature most significantly impacts transformers and overhead line conductors. The vulnerabilities include decreased life expectancy and decrease in capacity.

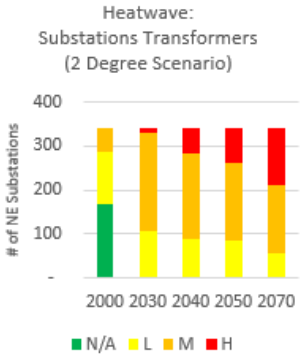
Wildfire is considered a secondary impact due to higher ambient temperatures and increasing periods of drought. We are beginning to review this risk now and expect the review to continue into 2024.











High Wind & Icing

Asset vulnerability to high wind and icing events (experience together or separately) is well known, having greatest impact on the overhead distribution network. Modeling shows areas of our service territory at greatest risk for these two hazards.

While exact projections to the degree of severity are not available, extreme weather events (e.g. hurricanes) are expected to grow in intensity due to sea-level rise, warming sea surface temperature, and atmospheric changes.

Although ambient air temperatures are increasing, warmer air holds more moisture and, in areas prone to snowfall, may have an increasing risk of an icing events.

We are considering a few adaptations to mitigate risks to the identified hazards

NOTE: The adaptations under consideration are based on initial findings of this assessment and we are in the early stages of developing adaptation plans. While some adaptations may be included in the first ESMP, we expect more adaptations to be included in subsequent filings.

Under Consideration
• Expand existing hardening measures to additional structures and locations (e.g., increase pole class and fiberglass arms)
• Install taller poles to account for additional wire sag due to higher ambient temperatures
• Expand coastal design of overhead and underground assets further inland
• Add flood protection at additional substations
• Identify and optimize standard transformer sizes through additional study work
• Change conductor and transformer rating methodology to consider increase in ambient temperatures
• Underground feeder segments
• Increase radial ice standard

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