

# GMAC MEETING BACKGROUND: DISTRIBUTION GRID CLIMATE RESILIENCE



**AUGUST 2025**

## CLIMATE RESILIENCE OVERVIEW

Climate resilience is the ability to prepare for, withstand, adapt to, and recover from the impacts of climate hazards. The [2022 Massachusetts Climate Change Assessment](#) identified multiple projected climate impacts including warmer temperatures, leading to more heat waves; fewer rainy days, leading to more droughts; more intense rainstorms, leading to flooding; and rising sea levels combined with more intense coastal storms. These climate stressors present significant risks to the Commonwealth, and require immediate action to prepare for, adapt to, and mitigate the risks.

## STATE PLANNING EFFORTS

[ResilientMass](#) is the Commonwealth's umbrella initiative for climate adaptation and resilience programs, policies, and initiatives. A fundamental component of this initiative is the 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan ([ResilientMass Plan](#)) which identifies actions state agencies and partners should take to reduce the risks of natural hazards and projected climate changes. The Plan prioritizes risk reduction for environmental justice and priority populations and considers how factors such as income, age, ability, and socioeconomic status could affect the impact of climate hazards on different populations.

The 2025 [ResilientCoasts](#) plan was developed pursuant to the ResilientMass Plan which identified the need for a statewide coastal resilience strategy. The plan contains a comprehensive statewide framework for coastal resilience, including actions and strategies to address vulnerability to coastal hazards, such as sea level rise, storm surge, wave action, and erosion.

*The ResilientMass Action Team ([RMAT](#)) is an interagency committee responsible for monitoring implementation of the ResilientMass Plan. It maintains the [ResilientMass Plan Action Tracker](#) which lists 100 priority actions identified in the plan to increase resilience in the Commonwealth.*

## STATE PLANNING FOR ELECTRIC GRID RESILIENCE

Massachusetts completed a [State Energy Security Plan](#) (SESP) in 2023 (updated in 2025) which assesses energy system vulnerabilities to both non-climate hazards, such as fuel volatility and cyber-attacks, and climate hazards, such as extreme weather events. SESP's assess electric grid vulnerabilities at the bulk power system level and detail how to ensure secure, reliable, and resilient energy infrastructure.

The Commonwealth is also conducting additional planning which focuses on the distribution level and builds upon already completed work. The remainder of this document focuses on climate threats to the distribution system, and the ways the Commonwealth and its Electric Distribution Companies (EDCs) are planning for, measuring, and investing in a climate-resilient distribution system.

## PLANNING FOR A RESILIENT ELECTRIC DISTRIBUTION SYSTEM

### GOALS OF A CLIMATE-RESILIENT DISTRIBUTION SYSTEM

Many climate hazards pose a threat to the ability of the distribution system to provide reliable power; extreme temperatures, coastal flooding, storm surge, and heavy precipitation all have the potential to cause power outages. A *reliable* distribution system can consistently provide electric service during normal operating conditions, whereas a *resilient* distribution system can both withstand and recover quickly from major weather events.

As the intensity and frequency of major weather events increases due to climate change, so does the importance of having a resilient distribution system. Moreover, growing reliance on electric power for communication (e.g., internet, phones) and for heating and transportation electrification brings greater consequences of power outages, thus further underscoring the importance of planning for and investing in distribution system resilience.

#### Measuring Resilience

- Typical reliability metrics, such as System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI), exclude events from the calculation if outage was caused by a major event, including weather events.
- All-in” SAIDI and SAIFI include these major event days and therefore can be a helpful measure of system resilience.
- The Department of Public Utilities is [currently investigating](#) adding resiliency performance metrics for electric distribution companies.

### INVESTING IN A RESILIENT ELECTRIC DISTRIBUTION SYSTEM

The [2022 Climate Law](#) directs the Electric Distribution Companies (EDCs) to plan for climate-driven impacts and incorporate resilience improvements into their Electric Sector Modernization Plans (ESMPs). Additionally, a priority action identified in the ResilientMass Plan was to work with electric utilities to assess critical infrastructure for climate vulnerability. National Grid recently published its [Climate Vulnerability Assessment](#) (CVA) which models the risk to its electric distribution infrastructure associated with the four priority climate hazards with the highest consequence and likelihood, as shown in the figure below. Eversource and Unitil are in the process of conducting their own CVAs.

Figure 1. National Grid Climate Vulnerability Assessment Risk Matrix. Source: National Grid CVA Table ES-1.

Climate Hazards	Electric Distribution Assets		
	Substation	Overhead Equipment	Underground and Pad-Mount Equipment
Rising Temperatures 	Moderate	Moderate	Low
Changes in Precipitation 	High	Moderate	Moderate
Coastal Flooding 	High	Moderate	Moderate
High Winds and Severe Weather 	Low	High	Low

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## WHAT RESILIENCE INVESTMENTS ARE IN THE ESMPS?

Each type of climate hazard vulnerability impacts electricity grid equipment differently and can be mitigated by a different type of infrastructure upgrade. For example, high winds impact overhead equipment and can be mitigated via enhancing tree trimming, whereas flooding associated with heavy precipitation can be mitigated by waterproofing and locating substations at higher elevations.

Eversource and Unitil proposed several resilience investments within their ESMPS, including undergrounding, aerial cable upgrades, spacer cable installation, and tree work. National Grid stated that they will propose comparable investments through their rate case. The Department of Public Utilities approved the budgets for these resilience investments, except for Eversource's budget for undergrounding, which the Department found was too large relative to the spending for recent historical undergrounding efforts and directed Eversource to reduce its undergrounding budget.

## FUTURE ELECTRIC DISTRIBUTION SYSTEM RESILIENCE PLANNING

In its order approving the ESMPS, the Department directed the EDCs to provide updates on their CVA frameworks and planned resilience investments in their first ESMP biannual reports. The Department also ordered the EDCs to provide updates on their investment identification and prioritization method and to assess the cost effectiveness of targeted resiliency investments as part of the planning process.

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## CLIMATE VULNERABILITY AND RESILIENCE PLANS

The [2024 Climate Act](#) mandates EDCs file a climate vulnerability and resilience plan (CVRP) every five years. The EDCs must conduct a risk assessment of potential climate impacts and identify, prioritize, and conduct a cost-benefit analysis of adaptation options. They also must present a community engagement plan with targeted engagement for environmental justice populations and an implementation timeline. The EDCs will submit the first CVRPs along with their next ESMPS in 2029.