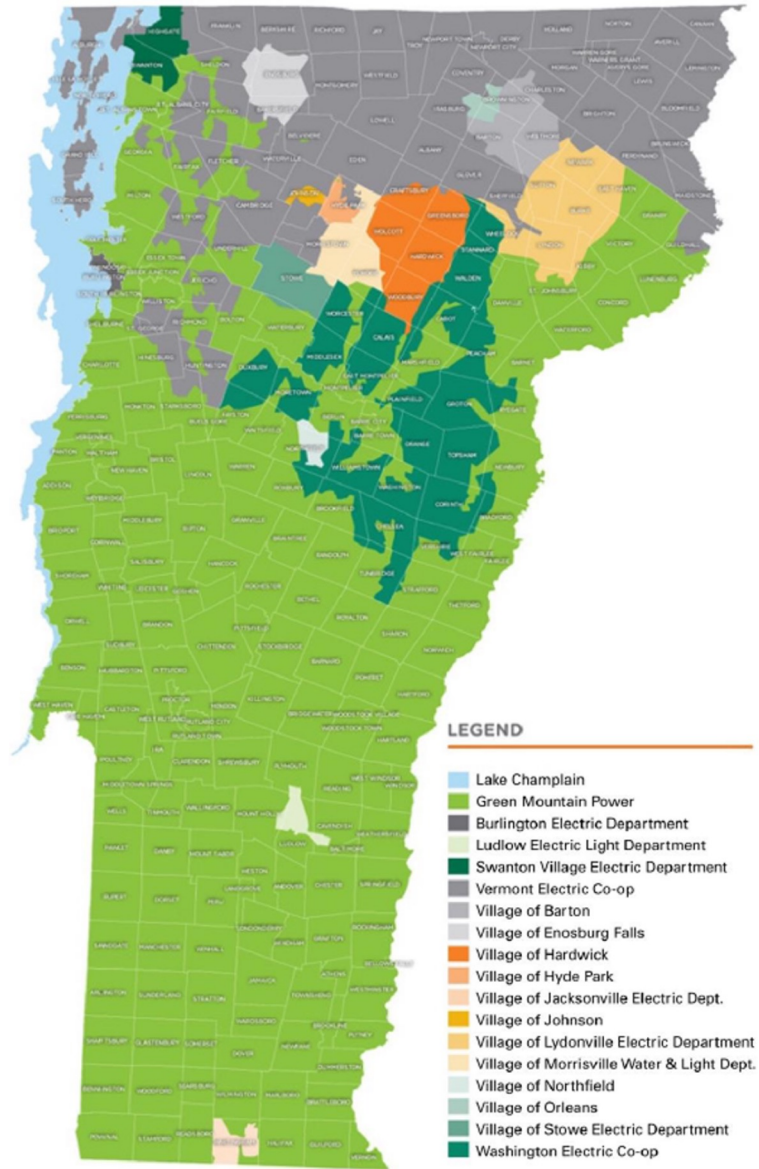


# Green Mountain Power

Resiliency Work to Keep Vermont Connected



# GMP: Who We Are



- ▶ GMP serves over 272,000 customers in 202 towns, covering 77% of Vermont
  - ▶ 85% residential customers, 15% businesses
  - ▶ Mostly rural and suburban territory with approximately 12,500 miles of distribution lines and 1,011 miles of sub-transmission
  - ▶ 15 district offices with teams across Vermont
  - ▶ About 510 employees, 285 are members of the IBEW Local 300
  - ▶ Our annual energy mix is 100% carbon free and 78% renewable
  - ▶ GMP will be 100% renewable by 2030



# Storms are Getting Worse & We are Ready

- ▶ Overall Trend:
  - ▶ Vermont is getting more severe, damaging water-heavy water
  - ▶ Unprecedented series of storms this winter
  - ▶ 3 of the top ten worst storms in GMP history, just this winter
  - ▶ All top ten storms in the last decade





# Storm Resilient: Overview

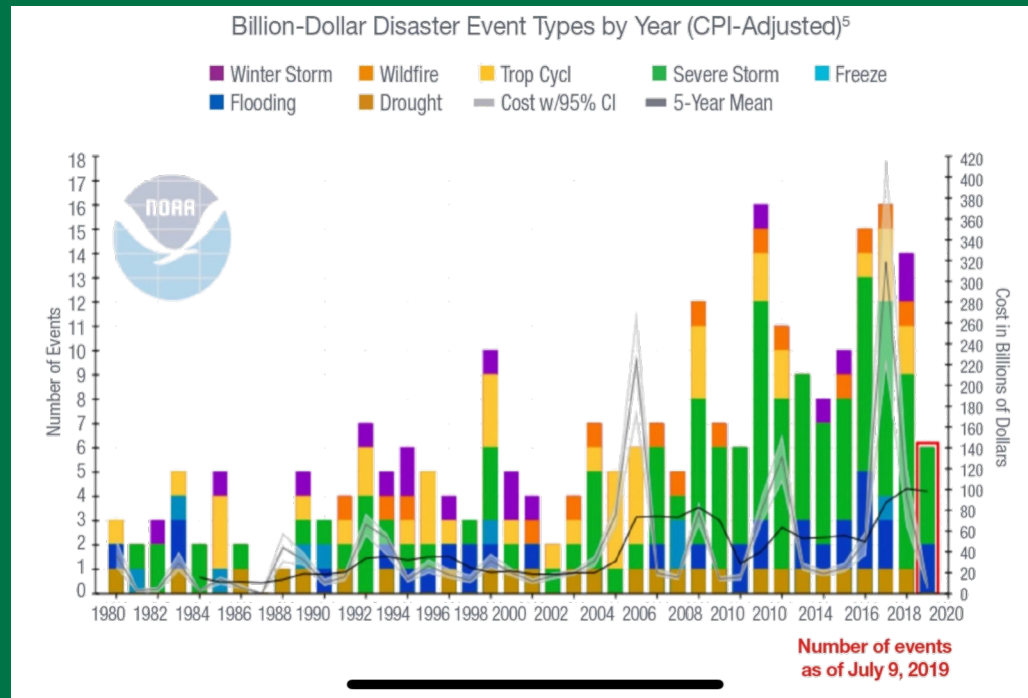
- ▶ 2020, state approved GMP's Climate Plan to launch targeted grid strengthening projects
- ▶ Expanding energy storage/batteries to keep customers powered up
- ▶ Microgrids & Resiliency Zones to keep communities powered up
- ▶ Extensive planning and resources in place prior to storms
- ▶ Partnering with Communities





# GMP's Proactive Climate Plan: Grid

- ▶ Upgrading infrastructure with Storm Hardened construction to better withstand today's changing climate.
- ▶ Undergrounding rural overhead lines, reducing the threat for outages while reducing maintenance costs.
- ▶ Using new and proven technologies such as self-healing distribution lines and battery storage to keep customers powered up.





# GMP's Proactive Climate Plan: Energy Storage

- ▶ GMP has deployed 40 MW of residential and utility scale batteries throughout Vermont
- ▶ Enough to power 20,000 homes for days
- ▶ Batteries strengthen the greater grid, add resiliency, and helps lower costs for all GMP customers
- ▶ Circuit, Town-level Storage, can isolate to microgrid if larger grid is damaged
- ▶ GMP deploying customized Resiliency Zones in partnership with communities to keep them powered up
- ▶ Home Storage can last for days if managed, and longer if paired with solar
- ▶ Batteries also reduce energy use at peak times on the grid, reducing costs for all customers





# Brattleboro District Climate Resilient Projects

- ▶ Route 30, Jamaica to Dummerston, through Townsend and Newfane and parts of Dover and Brookline
- ▶ Route 100-Wardsboro-Main backbone from Route 30 along Rt. 100 into Wardsboro.
- ▶ West Hill Rd from Townsend Dam-Main feed into rural parts of Dover and Wardsboro, VH4A.
  - ▶ State permitting can add years to this work
- ▶ Resiliency Zone in Brattleboro
- ▶ Resiliency Zone in Grafton



# Partnering with Communities on Resiliency



- ▶ Extensive Outreach before, during, and after storms
  - ▶ Including regional and local updates to local officials
- ▶ Communities with their own plans/staffing for severe weather are more resilient
  - ▶ Identifying points of contact is key



# Storm Prep & Planning



- ▶ Green Mountain Power monitors 4 forecasters and multiple weather models days in advance of any storm.
  - ▶ Forecasters-
    - ▶ VT Utility Forecaster Roger Hill
    - ▶ Disaster Tech-Northern VT University born weather prediction
    - ▶ National Weather Service-Burlington(12 VT Counties)
    - ▶ National Weather Service-Albany(2 VT Counties)
  - ▶ Weather Models-
    - ▶ GFS-Global Forecast System
    - ▶ Euro-European Forecast Model
    - ▶ NAM-North American Model
  - ▶ Outage Prediction-
    - ▶ Internal GMP present weather vs prior weather prediction
    - ▶ Disaster Tech-Prediction based on total precipitation and how much is frozen.
  - ▶ Customer Outreach: Proactively alert customers/communities
    - ▶ Text alerts, emails, social media, web site, press releases, robo-calls, critical care customer outreach
- ▶ Secure and pre-position GMP team, and extra crews brought in to help, as needed



# GMP Nor'easter Response

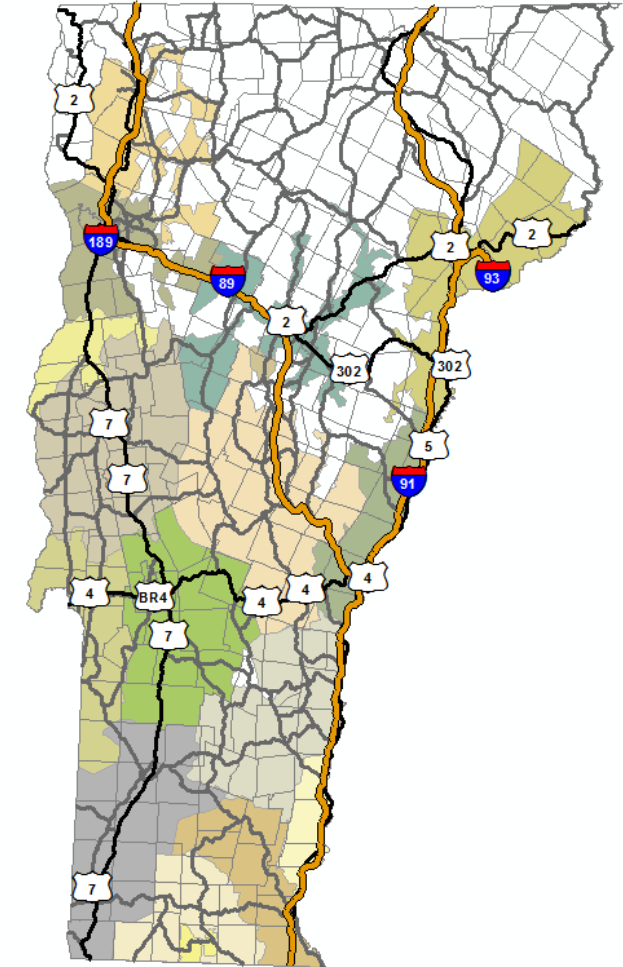
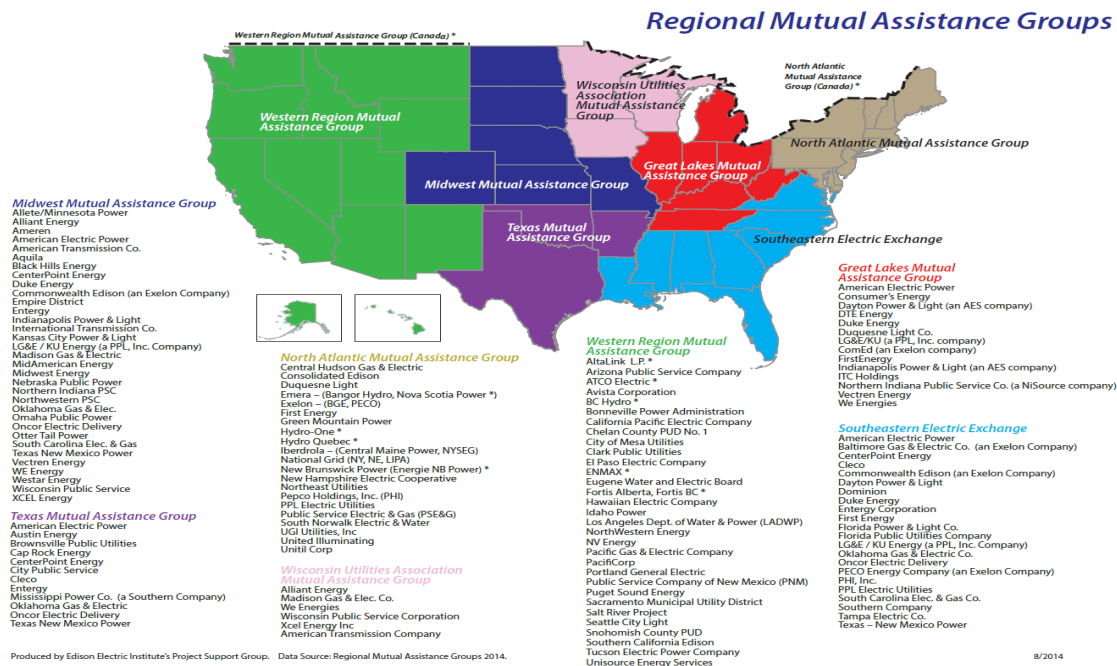


- ▶ T&D / Line Workers
  - ▶ 650 field workers
- ▶ Tree Crews
  - ▶ 250 field workers
    - ▶ Quadrupling our internal field force
    - ▶ Crews from: NH, MA, ME, NY, Quebec, New Brunswick, KY, PA.
- ▶ Everyone at GMP works during a storm with cross trained functions to serve customers.
  - ▶ In addition to: Call Center, Relay Techs, Power Production, Designers, Engineers, Meter Service, Control Center Operators.

# Storm Restoration

- ▶ Distribute Resources to the hardest hit areas.
- ▶ Communicate often with customers as information becomes available. High level restoration times once damaging weather stops, when the last customers in a geographic area will be back on.
- ▶ Have districts run storm response in their area for efficiency

- ▶ GMP's 15 operating districts





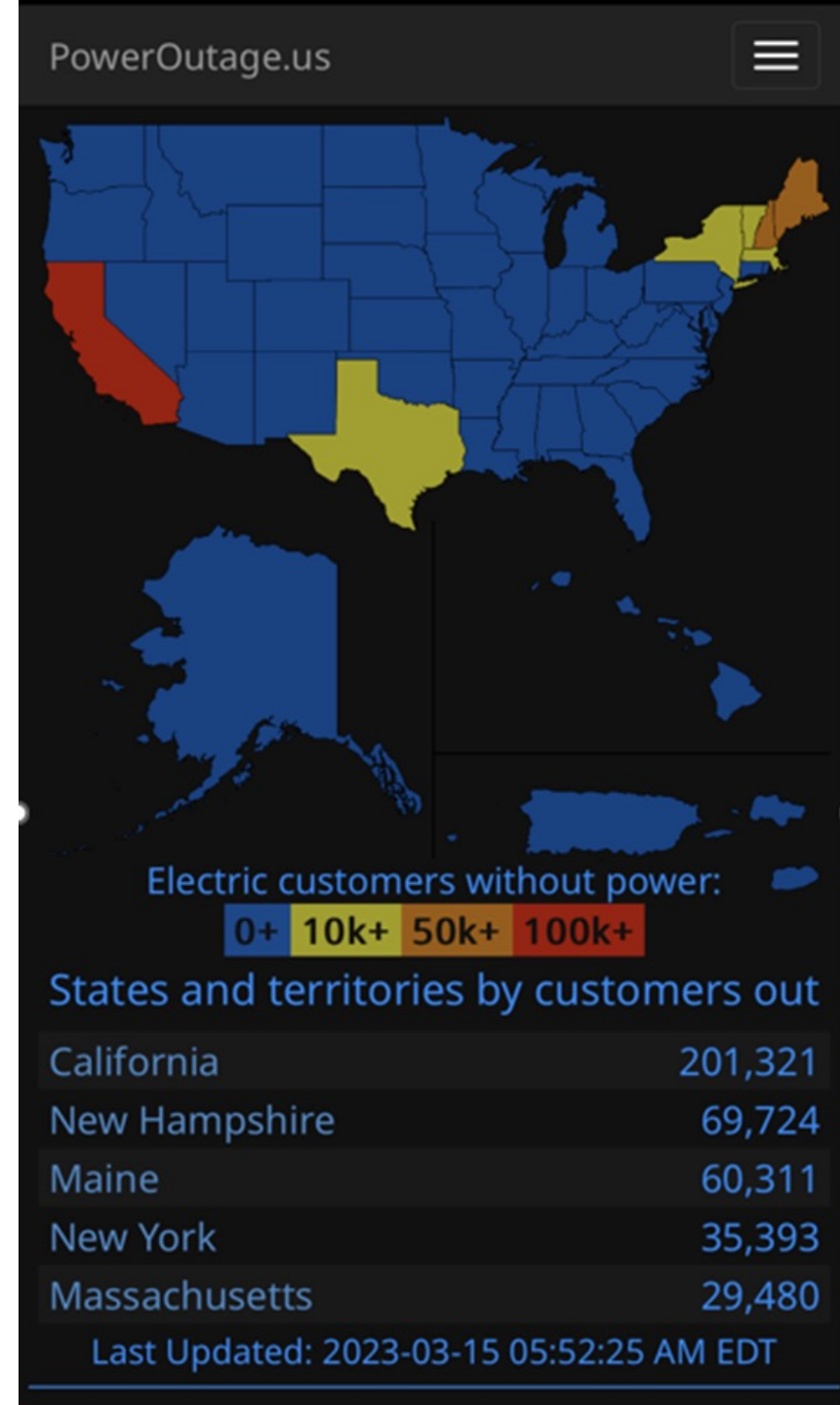
# GMP Power Restoration Process

1. Clear Hazards
2. Repair Transmission & Substation Facilities
3. Restore Hospitals & Emergency Response Facilities
4. Repair Main Distribution Lines
5. Restore Areas with Largest Number of Customers
6. Restore Isolated Events

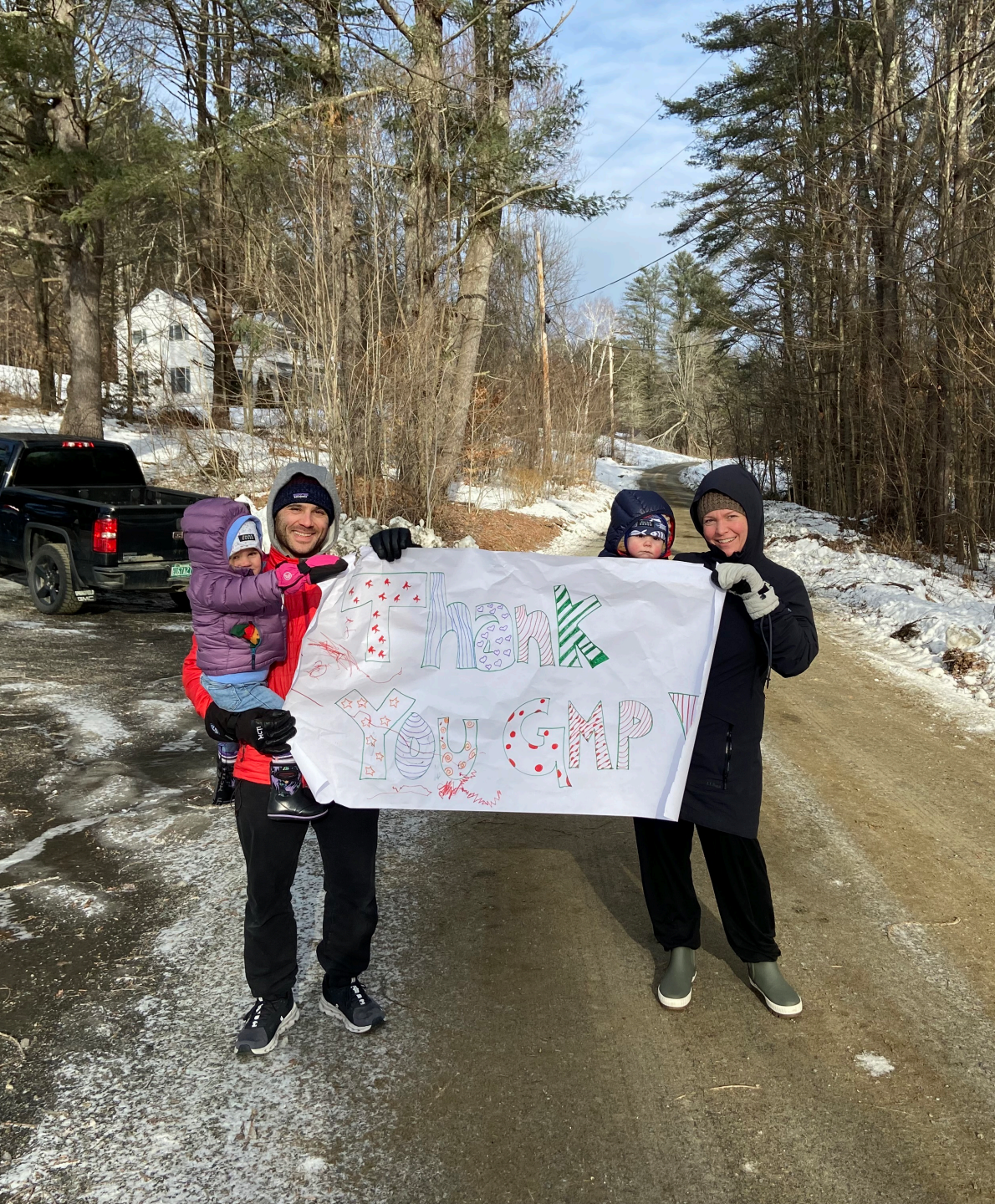


# March Nor'easter Caused Widespread Damage

- ▶ Nor'easter brought cement-like snow, hitting southern Vermont especially hard, weighing down and tearing down lines and uprooting trees.
- ▶ The forecast shifted, expanding the areas of the state affected by the storm, and extending the time the severe weather sat over Vermont, causing more damage.
- ▶ Crews faced challenging conditions
  - ▶ Even as they restored power to thousands of customers during the first 24 hours, much of their time was assisting local communities in clearing roads to make them safe for first responders.
- ▶ Crews restored power to more than 102,000 customers







# QUESTIONS?

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