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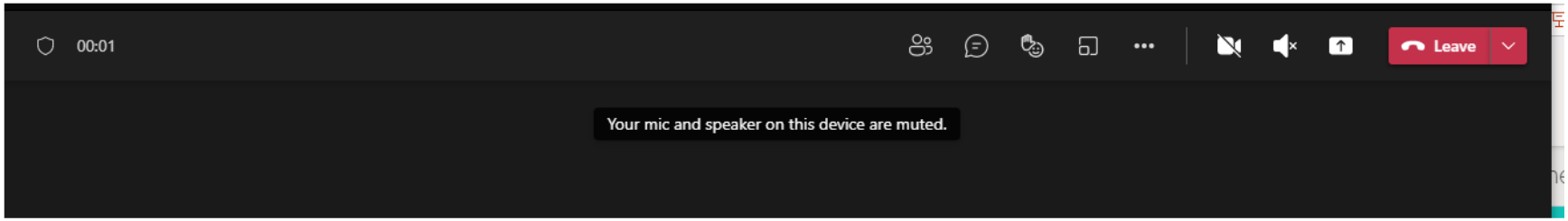
WELCOME TO THE
Climate Change Vulnerability & Resiliency Plan
Working Group Session – Study Review

The meeting will begin shortly

Engagement during this call

Please Note: This meeting is being recorded



Chat box – you can type comments or questions

Climate Change Vulnerability & Resiliency Plan Working Group Session – Study Review

July 19, 2023

Agenda

- Welcome and introductions
- Project Context & Role of the Working Group
- Recap of Last Meeting
- Vulnerability Assessment Summary of Findings
- Discussion & Feedback
- Next Steps - Climate Change Resilience Plan

Project Description & Role of the Working Group

Why are we here?

Meeting Purpose

New York State recently passed legislation requiring electric utilities to perform climate vulnerability studies designed to understand the impacts for the expected increase in severe weather due to climate change.

Following the study, utilities will prepare resilience plans detailing what changes are needed to prepare for harsher climate realities, including stronger storms, more flooding, temperature extremes.

The Resilience Plans will be reviewed and approved by the Public Service Commission.

The purpose of today's meeting is to tell you more about these new requirements and timeline as well as Central Hudson's efforts to respond.

An important part of our planning is to understand and incorporate local concerns and priorities. We will discuss with you today how we can organize those discussions.

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NY Public Service Law§66(29) Effective 3/22/2022 and PSC Case 22-E-0222

Climate Change Vulnerability Study

- Establish “climate resilience working group” by 3/2023 to advise on Resilience Plan including municipalities, customer advocacy groups, and energy/environmental advocates
- Study Due September 2023
- Evaluate infrastructure, design specifications, and procedures to identify vulnerabilities
- Include adaptation measures to address vulnerabilities; feeds into Resilience Plan
- Study to be performed with supporting climate data from NYSERDA & Columbia University

Climate Change Resilience Plan

- Due November 2023
- Propose storm hardening measures for next 10 and 20 years
- Detail how climate change reflected in planning, design, operations, & emergency response
- Address impacts on costs, outage times, potential for undergrounding lines, etc.
- Additional requirements the PSC may identify

PSC Review and Approval

- Within 11 Months of Filing Resilience Plan
- Stakeholder engagement into utility plans is an important component

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Central Hudson Current Working Group

Name	Organization	Name	Organization
Natalie Quinn	City of Poughkeepsie	Jessica Ridgeway	Orange County
Julie Nobel	City of Kingston		Greene County
	City of Newburgh	Bridget Frymire Afredita Bardhi Eric Moore Brandon Goodrich	DPS Staff
Patrice Perry Don Meltz	Columbia County	Danielle Panko Gregg Collar	NYS DOS UIU
Michael Madison Everett Erichsen	Ulster County	Simon Strauss	Town of Olive
Allan Page	Dutchess County	Robert Mack	NYSERDA
Patrick Curran	Albany County	Melanie Franco Michael Mager	Multiple Intervenors
Justin Rocque	Sullivan County	Laurie Wheelock	PULP
Ilona Campo	Putnam County	John Rath	NY Geo
Melissa Everett	Sustainable HV	Manna Jo Greene	Clearwater

Role of Working Group and Stakeholder Engagement Roadmap

September 2022	February 2023	Spring 2023	Summer 2023	Fall 2023 and Beyond	Fall 2024 and beyond
• Initial Outreach to Create Awareness and Seek Preliminary Input	• Local Community Feedback to Identify Priorities	• Initial Meeting Climate Resilience Working Group • Input into scenarios	• Development of Stakeholder Feedback Loop in Draft Study and Plan	• Input from Stakeholders on Plan • Filing of Resilience Plan • Approval and Execution	• Report to Stakeholder on plan and other updates

Recap of Prior Meeting

Project approach and components

Climate Scenario Deep Dive

Equity and justice considerations

Study Approach and Plan Development

- System Asset Exposure
- Assess Asset Sensitivity
- Determine Negative Asset Impact
- Identify System or Asset Vulnerability
- Recommend Measures to Address Impact
- Perform Benefit/Cost Analysis

- **With the help of Utility Consultants and Climate Scientists**
- **With input from Stakeholder Engagement and Working Groups**
- **With Review and Approval by the Public Service Commission**

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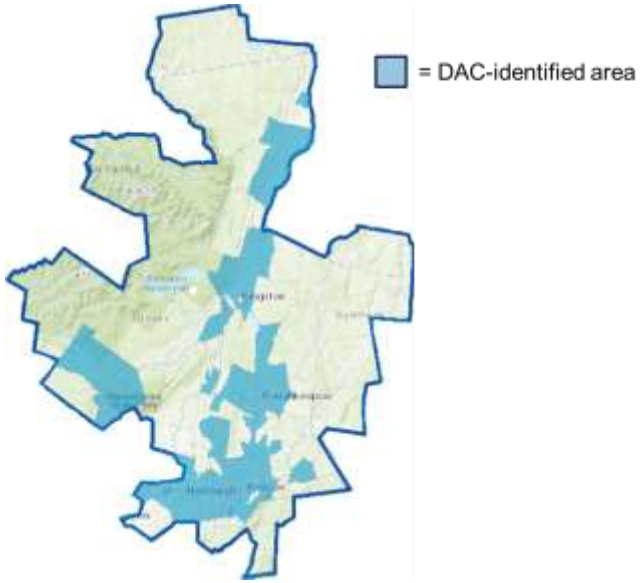
Prior Meeting Study Review

- Use of Consistent Data Sources
- Elements of Climate Change
- Vulnerability Assessment Process
- Identified some of the Vulnerabilities of the Central Hudson Electric System

Prior Meeting Study Review

- Scenario Deep Dive
  - Identifying and Selecting Pathways
  - Evaluating at which Percentiles
- Equity and Justice Considerations



Vulnerability Assessment Summary of Findings

FROM THE DRAFT STUDY REPORT

Climate Variables Assessed

- Extreme Heat
- Extreme Cold and Ice
- Extreme Precipitation
- Flooding
- Wind/Compound Storm Events

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Central Hudson Assets Assessed

- Transmission:
  - Line structures (poles/towers)
  - Conductors (overhead)
  - Conductors (underground)
  - Switching devices
- Substation:
  - Transformers
  - Voltage regulators
  - Circuit breakers
  - Instrument transformers (CTs and PTs)
  - Reactors
  - Controllers for regulators and LTCs
  - Switching devices
  - Surge arresters
- Distribution:
  - Poles
  - Conductors (overhead)
  - Conductors (underground)
  - Transformers (overhead)
  - Transformers (padmount)
  - Voltage regulators
  - Capacitors
  - Switching devices
  - Surge arresters
  - Reclosers
  - Manholes

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Vulnerability Assessment Process

Exposure
The degree to which assets, operations, or systems could face climate hazards, based on their physical locations and projected hazards.

Potential Impact
The potential for negative outcomes in the event of climate hazard exposure.

Sensitivity
The degree to which assets, operations, or systems could be affected by exposures.

Consequence
Estimated magnitude of negative outcomes associated with impacts. Incorporates criticality and adaptive capacity.

Vulnerability
The potential of assets or operations to be affected by projected hazards, and the significance of the potential consequences.

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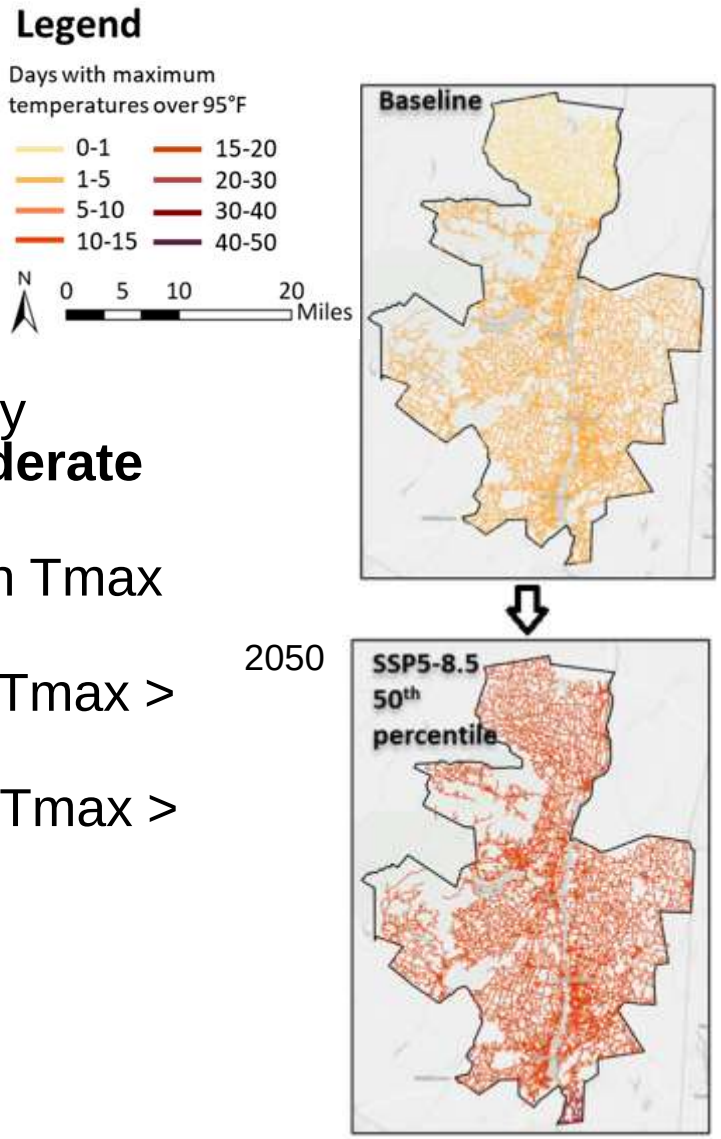
Vulnerability Study Results



- Extreme Heat
  - Asset exposure to extreme heat is currently considered **low** and is projected to be **moderate** by mid-century and **high** by late-century
    - Baseline: Average of **1.3** days/year with Tmax > 95°F
    - 2050s: Average of **11.4** days/year with Tmax > 95°F
    - 2080s: Average of **35.5** days/year with Tmax > 95°F
  - Most vulnerable asset types:
    - Substation transformers
    - Transmission overhead conductors

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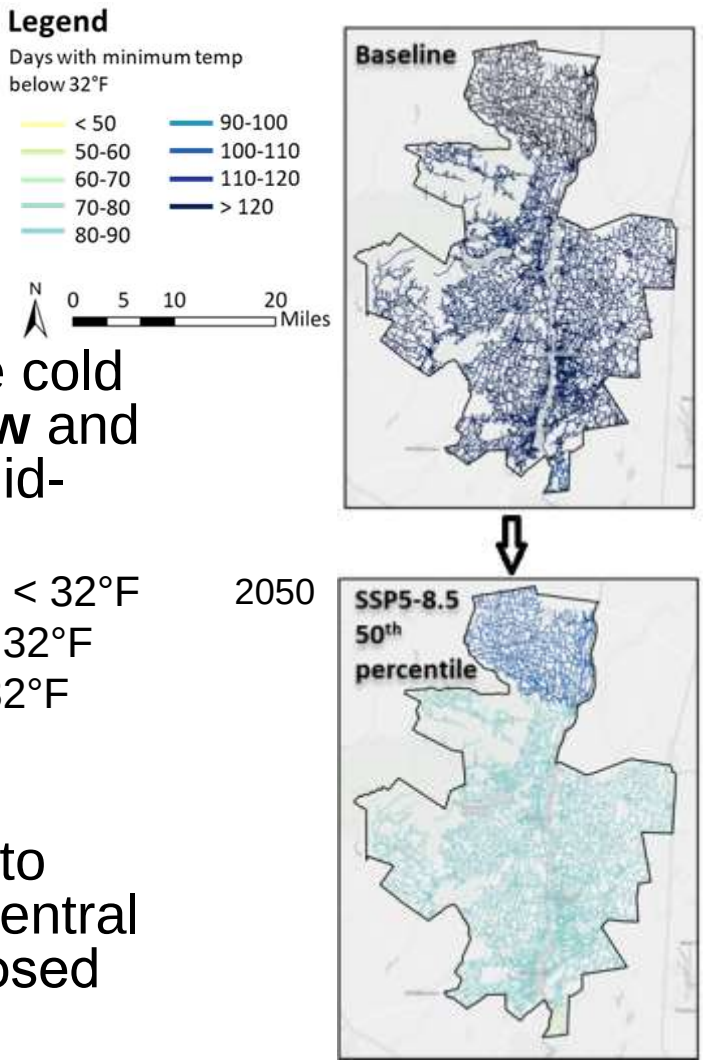
Vulnerability Study Results



- Extreme Cold and Ice
  - Asset exposure to freezing and extreme cold temperatures is currently considered **low** and is projected to become **lower** by both mid-century and late-century
    - Baseline: Average of **139.2** days/year with Tmin < 32°F
    - 2050s: Average of **102.3** days/year with Tmin < 32°F
    - 2080s: Average of **77.6** days/year with Tmin < 32°F
  - As temperatures warm through the 21st century, the frequency of freezing and extreme cold temperatures is projected to decrease, and a smaller proportion of Central Hudson's service territory could be exposed to extreme cold temperatures.

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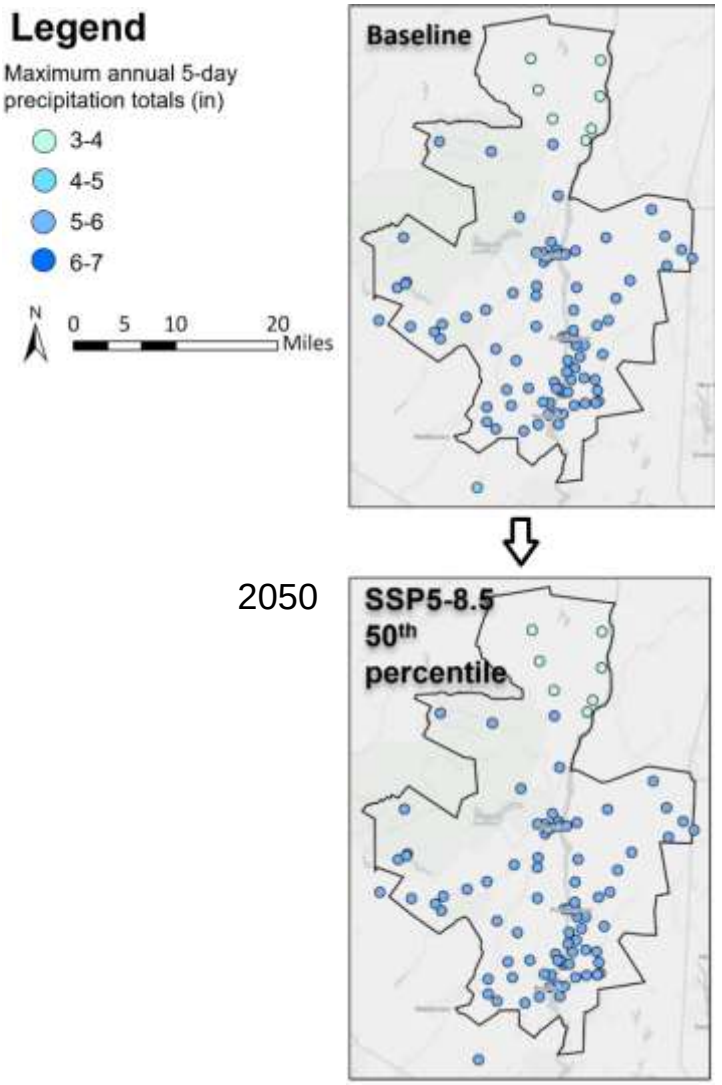
Vulnerability Study Results

- Extreme Precipitation
  - Asset exposure to extreme precipitation is currently considered **moderate** and is projected to increase gradually but remain **moderate** by both mid-century and late-century
    - Baseline: **5.2”** maximum five-day precipitation totals
    - 2050s: **5.8”** maximum five-day precipitation totals
    - 2080s: **6.3”** maximum five-day precipitation totals
  - Most vulnerable asset types:
    - Distribution poles
    - Distribution underground conductor
    - Substation switchgear-style circuit breakers



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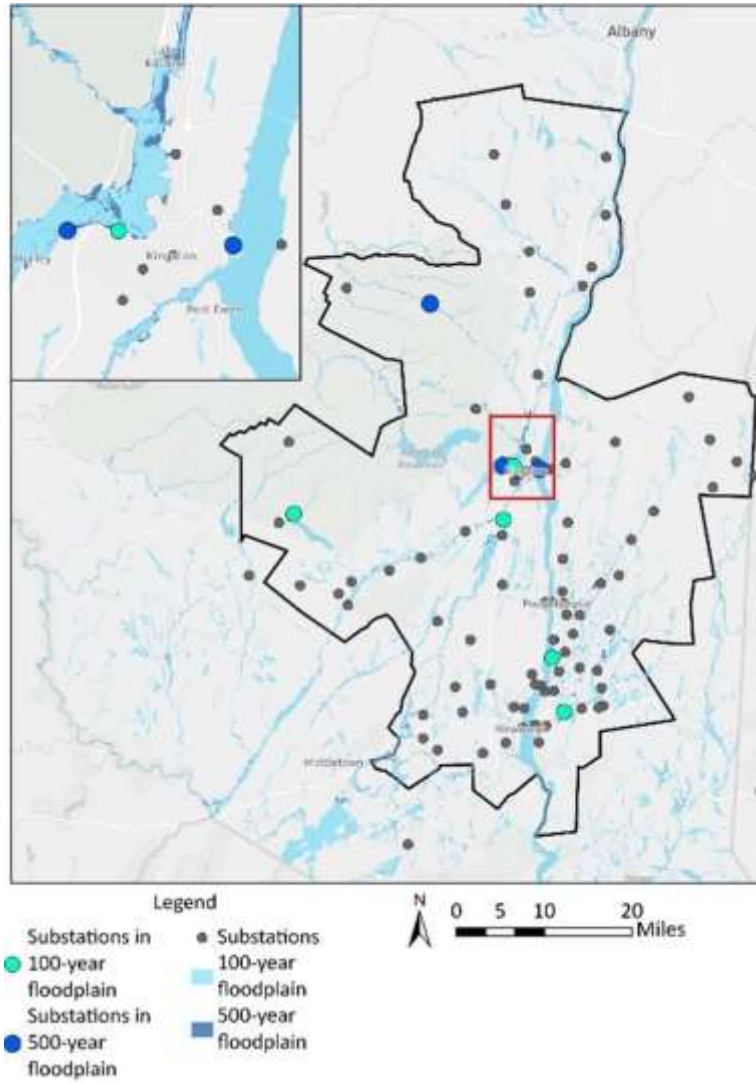
Vulnerability Study Results

- Flooding
  - Asset exposure to flooding is currently considered **low** and is projected to increase to **moderate** by mid-century and remain **moderate** by late-century.
  - Percentage of Central Hudson assets located within 100- and 500-year FEMA Floodplains:
    - Substations: 5% 100-year → 9% 500-year
    - Transmission structures: 8% 100-year → 9% 500-year
    - Distribution poles: 4% 100-year → 5% 500-year
    - Underground conductor: 3% 100-year → 4% 500-year
  - Compounded by sea level rise (SLR) affecting the Hudson River
    - 16” SLR projected by 2050
    - 30” SLR projected by 2080
  - Most vulnerable asset types:
    - Distribution poles
    - Distribution underground conductor
    - Substation switchgear-style circuit breakers



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Vulnerability Study Results

- Wind
  - Quantitative regional projections for wind not available using current climate models
    - Daily average wind speed is not projected to be heavily impacted by climate change
    - The most extreme winds and wind gusts during severe weather events could increase by the end of the 21st century
  - Most vulnerable asset types:
    - Distribution poles and overhead conductors
    - Impacts are primarily wind on **vegetation** which in turn contacts poles and wires

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Participant Questions & Feedback

Questions

Comments

Feedback

Next Steps: Resilience Plan

- Effective adaptation measures should strive to accomplish one or more of the following:
  - **Strengthen** assets and operations to **resist** adverse impacts of a climate hazard event.
  - Increase the system's ability to **anticipate** when a climate hazard may occur and **absorb** its effects
  - **Bolster** the system's ability to quickly **respond and recover** in the aftermath of a climate hazard event.
  - **Advance and adapt** the system to address a continuously changing threat landscape and perpetually improve resilience

Next Steps: Resilience Plan

- Through November 2023 (filing date):
  - Workshop series with Subject Matter Experts to determine preferred resilience measures
  - Collecting cost information for preferred measures
  - Determining costs and benefits
  - Developing proposed schedule for implementation of resilience measures
  - Determining annual rate impact of proposed measures
  - Drafting report text/revisions
  - Issue final report

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Working Group Next Steps

Climate Resiliency Working Group

- Looking ahead
  - An update following this meeting
  - Meeting invitation for the next CRWG meeting to review the Resiliency Plan.
  - Central Hudson's Vulnerability Study will be filed in Case 22-E-0222 on September 22, 2023

Additionally, if you or your organization would like to make your voice heard in the statewide proceeding, you can submit comments directly to the PSC by filing comments in the case number 22-E-0222.

Thank You

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