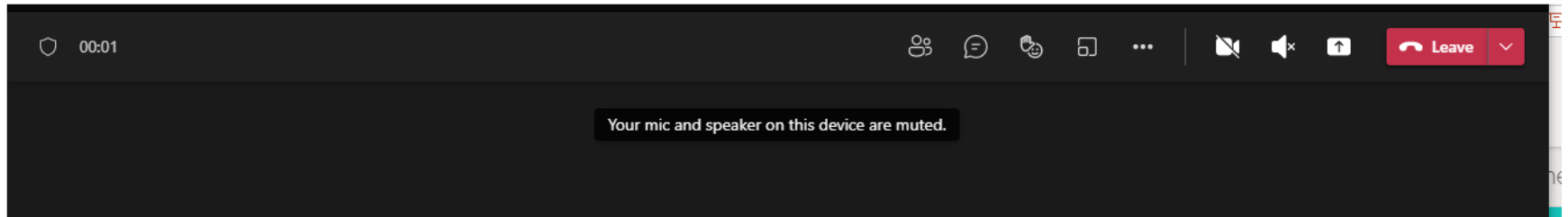


**WELCOME TO THE
Climate Change Vulnerability
& Resiliency Plan
Working Group Session – Resiliency Plan
Review**

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 – Resiliency Plan Review

November 2, 2023

Agenda

- Welcome and introductions
- Project Context & Role of the Working Group
- Draft Resiliency Plan and Recommendations
- Discussion & Feedback
- Next Steps – Post Plan Filing Meetings

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.



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

Central Hudson Current Working Group

Name	Organization	Name	Organization
Natalie Quinn	City of Poughkeepsie	Jessica Ridgeway Dominick Greene	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
<ul style="list-style-type: none">Initial Outreach to Create Awareness and Seek Preliminary Input	<ul style="list-style-type: none">Local Community Feedback to Identify Priorities	<ul style="list-style-type: none">Initial Meeting Climate Resilience Working GroupInput into scenarios	<ul style="list-style-type: none">Development of Stakeholder Feedback Loop in Draft Study and Plan	<ul style="list-style-type: none">Input from Stakeholders on PlanFiling of Resilience PlanApproval and Execution	<ul style="list-style-type: none">Report to Stakeholder on plan and other updates

Study Approach and Plan Development



System Asset Exposure



Assess Asset Sensitivity



Determine Negative Asset Impact



Identify System or Asset Vulnerability



Identify Potential Measures to Address Impact



Determine Costs and Benefits

- **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**

Resilience Plan Process/Results and Draft Plan Highlights

Resilience Plan: Determining Priority Assets

- Determining Priority Assets for Resilience:
 - Load Service
 - Critical Customers
 - Storm Performance
 - Critical Infrastructure
 - Asset Health
- Initial Results:
 - 37 Distribution Circuits
 - 15 Substations
 - 3 Transmission Lines

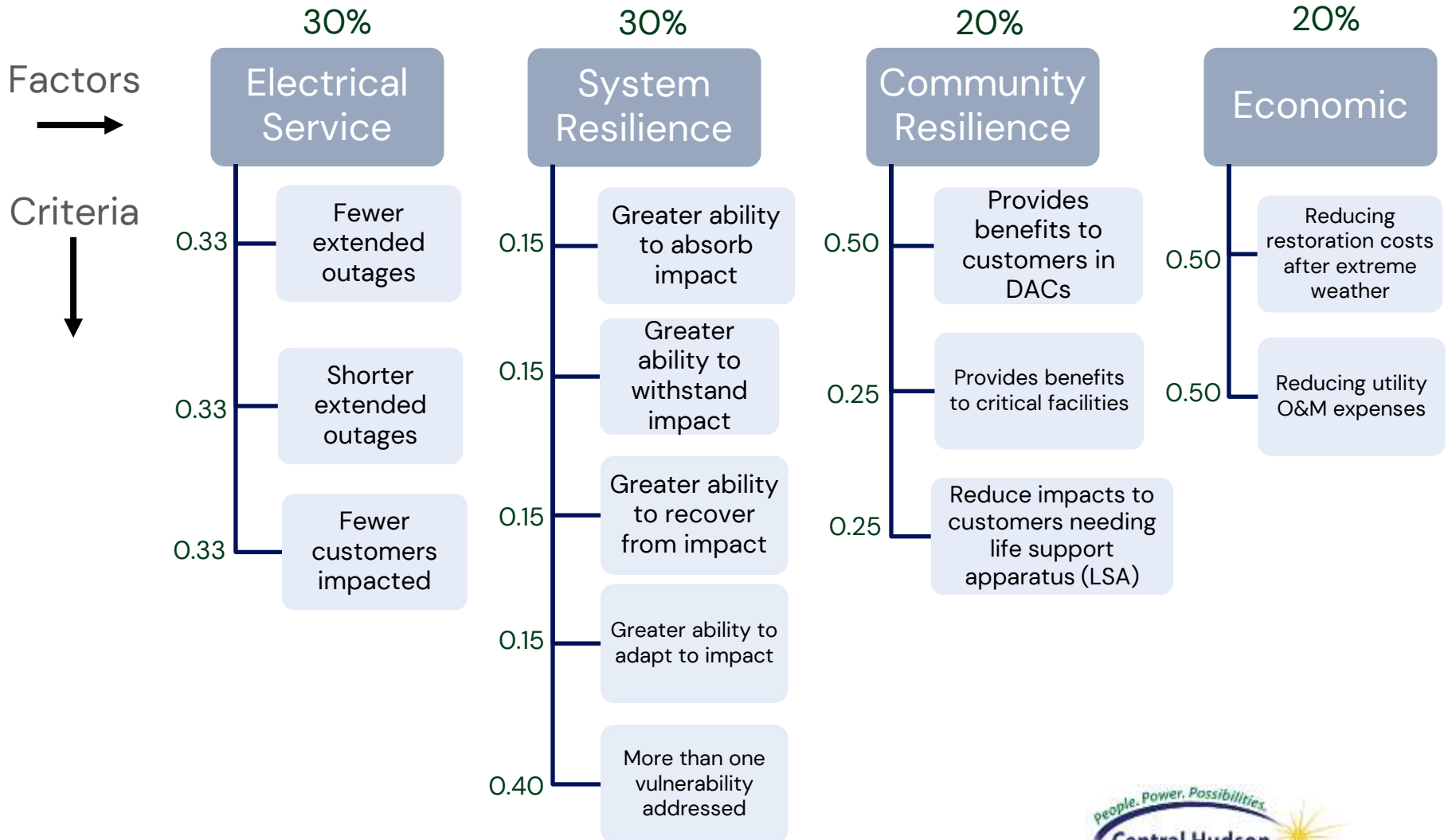
Resilience Plan: Selecting Mitigation Measures

- Selecting Mitigation Measures:
 - Began with a large list that was the result of a brainstorm between Central Hudson subject matter experts and consultant ICF for each of the most vulnerable asset/hazard combinations identified in the Vulnerability Study
 - Looked at each combination of Priority Asset and applicable Mitigation Measure and asked the questions:
 - Is it feasible?
 - Does it make sense to consider?
- Narrowed-Down Results:
 - 37 Distribution Circuits
 - 3 Substations
 - 2 Transmission Lines

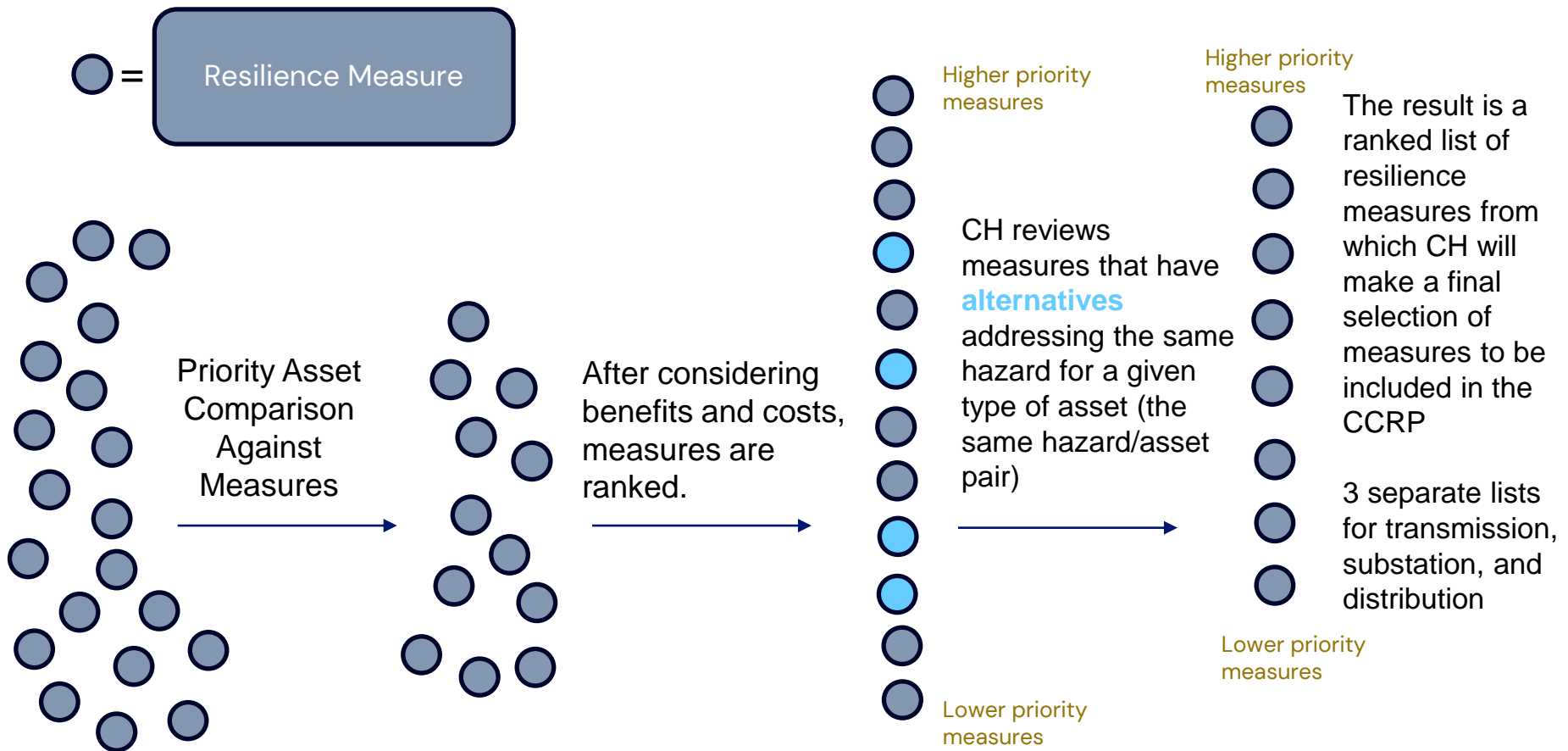
Resilience Plan: Prioritizing Measures

- Prioritizing measures
 - Gather costs and determine benefits for each resilience measure
 - Benefits determined using Multi-Criteria Decision Analysis (MCDA) framework

Resilience Plan: MCDA Framework for Calculating Benefit Scores



Resilience Plan: Prioritization



Note: the number of circles is for demonstration purposes and is not intended to represent any exact numbers.

Resilience Plan: Proposed Mitigation Measures

- Substation:
 - Projects:
 - Raise vulnerable switchgear at three substations in flood plain
 - Timing to correlate with next major station upgrades to save costs
 - Costs of raising switchgear to be tracked separately from other planned “business as usual” station work
 - Process changes:
 - Inspect vulnerable substations following significant rain/flooding events
 - Add floodplain considerations in capital budget project submittal forms

Resilience Plan: Proposed Mitigation Measures

- Transmission:
 - Projects:
 - Incremental hazard tree removals to address the effects of increased wind hazards on vegetation affecting two Priority-identified transmission lines
 - 1-mile section identified on one line (Woodstock) and 2-mile section identified on the other (Wawarsing)
 - Use of high temperature low sag (HTLS) conductor on one Priority-identified transmission line to address extreme heat
 - Timing to correlate with next major line upgrade to save costs
 - Incremental cost of conductor to be tracked separately from other planned “business as usual” upgrades
 - Process change:
 - Modify Central Hudson Transmission Design Guidelines to consider use of alternate foundation design for structures being replaced in flood plain

Resilience Plan: Proposed Mitigation Measures

- Distribution:
 - Projects and programs to address increased wind on vegetation affecting Priority-identified circuits:
 - 4 microgrid projects
 - Lateral line rebuild program using composite poles
 - Targeted “Ground to sky” trimming program
 - Strategic undergrounding program
 - Process changes:
 - Pole wrap installations for new poles within floodplains
 - Add floodplain considerations to capital budget project submittal forms

Resilience Plan: Costs for Years 1-5 (2025-2029)

Classification	Type	Resilience Measure	Asset	Hazard	5-Year Cost (2025-2029)
Transmission	Project	HG Line - Use of HTLS Conductor on 16 miles of rebuild (Incremental cost to align with rebuild)	Overhead Conductors	Extreme Heat	\$605,000
Transmission	Project	SR Line - Incremental hazard tree removals between structure #112824 and structure #112845	Structures and Overhead Conductors	Extreme Wind	\$30,000
Transmission	Project	HG Line - Incremental hazard tree removals between structure #27501 and structure #27539	Structures and Overhead Conductors	Extreme Wind	\$90,000
Substation	Project	Converse Street - Raise switchgear (Incremental cost to align with other major upgrades)	Switchgear-style Circuit Breakers	Extreme Precipitation and Flooding	\$1,000,000
Distribution	Program	Strategic Undergrounding Program	Poles and Overhead Conductors	Extreme Wind	\$10,000,000
Distribution	Program	Targeted "Ground-to-sky" Trimming Program	Poles and Overhead Conductors	Extreme Wind	\$5,250,000
Distribution	Program	Lateral Line Rebuilds Using Composite Poles Program	Poles and Overhead Conductors	Extreme Wind	\$11,250,000
Distribution	Process Change	Pole Wrap Installations	Poles	Extreme Precipitation and Flooding	\$387,750
				TOTAL:	\$28,612,750

Resilience Plan: Ballpark Costs for Years 6-10 (2030-2034)

Classification	Type	Resilience Measure	Asset	Hazard	10-Year Cost (2030-2034)
Substation	Project	Forgebrook - Raise switchgear (Incremental cost to align with other major upgrades)	Switchgear-style Circuit Breakers	Extreme Precipitation and Flooding	\$4,000,000
Substation	Project	Hurley Avenue - Raise switchgear (Incremental cost to align with other major upgrades)	Switchgear-style Circuit Breakers	Extreme Precipitation and Flooding	\$4,000,000
Distribution	Project	3078 Circuit - Microgrid - Cragsmoor	Poles and Overhead Conductors	Extreme Wind	\$1,250,000
Distribution	Project	3078 Circuit - Microgrid - Spring Glen	Poles and Overhead Conductors	Extreme Wind	\$1,250,000
Distribution	Program	Strategic Undergrounding Program	Poles and Overhead Conductors	Extreme Wind	\$15,000,000
Distribution	Program	Targeted "Ground-to-sky" Trimming Program	Poles and Overhead Conductors	Extreme Wind	\$6,125,000
Distribution	Program	Lateral Line Rebuilds Using Composite Poles Program	Poles and Overhead Conductors	Extreme Wind	\$12,187,500
Distribution	Process Change	Pole Wrap Installations	Poles	Extreme Precipitation and Flooding	\$387,750
				TOTAL:	\$44,200,250

Resilience Plan: Ballpark Costs for Years 11-20 (2035-2044)

Classification	Type	Resilience Measure	Asset	Hazard	20-Year Cost (2035-2044)
Distribution	Project	2387 Circuit - Microgrid - Lanesville	Poles and Overhead Conductors	Extreme Wind	\$1,250,000
Distribution	Project	7081 Circuit - Microgrid - Millerton	Poles and Overhead Conductors	Extreme Wind	\$2,500,000
Distribution	Program	Strategic Undergrounding Program	Poles and Overhead Conductors	Extreme Wind	\$40,000,000
Distribution	Program	Targeted "Ground-to-sky" Trimming Program	Poles and Overhead Conductors	Extreme Wind	\$14,000,000
Distribution	Program	Lateral Line Rebuilds Using Composite Poles Program	Poles and Overhead Conductors	Extreme Wind	\$26,250,000
Distribution	Process Change	Pole Wrap Installations	Poles	Extreme Precipitation and Flooding	\$775,500
				TOTAL:	\$84,775,500

Resilience Plan: Performance Metrics - Distribution

Resilience Measure	Anticipated Benefits	Performance Metric
Microgrid installation projects	<ul style="list-style-type: none"> Ability to operate independently (i.e., ability to continue powering local communities during 'macro grid' outage events) 	Number of successful microgrid operations and total number of customers/customer-hours saved.
	<ul style="list-style-type: none"> Increase system reliability by helping to improve management of electricity demand 	
Strategic undergrounding of critical distribution infrastructure program	<ul style="list-style-type: none"> Reduce exposure to weather and climate hazards 	Outage frequency performance for aggregated circuits completed to date compared to a baseline 3-year historical average. If improvements are not indicated, reporting should include a narrative of why this may be the case.
	<ul style="list-style-type: none"> Enhance system reliability by minimizing outages caused by physical weather impacts (i.e., wind, falling tree limbs...) 	
	<ul style="list-style-type: none"> Reduce maintenance costs over long term 	
Lateral line rebuilds using composite poles program	<ul style="list-style-type: none"> Reduce maintenance needs due to longer pole lifespan 	Outage frequency and duration performance for aggregated circuits completed to date compared to a baseline 3-year historical average. If improvements are not indicated, reporting should include a narrative of why this may be the case.
	<ul style="list-style-type: none"> Reduce pole failure rates by creating higher resistance to climate hazards, minimizing customer outages 	
	<ul style="list-style-type: none"> Reduce time required to install poles which can improve restoration times 	
Targeted "ground-to-sky" trimming program	<ul style="list-style-type: none"> Minimize cost of restoration and impact during extreme climate events 	Outage frequency performance for aggregated circuits completed to date compared to a baseline 3-year historical average. If improvements are not indicated, reporting should include a narrative of why this may be the case.
	<ul style="list-style-type: none"> Reduce customer outages caused by falling tree limbs or debris 	

Resilience Plan: Performance Metrics – Substation and Transmission

System	Resilience Measure	Anticipated Benefits	Performance Metric
Substation	Raise substation switchgear	<ul style="list-style-type: none"> Decrease probability of customer outages due to flooding events 	Number of customer outages caused by substation flooding at substations where flood mitigation work has been completed.
		<ul style="list-style-type: none"> Improve restoration time and minimize restoration costs 	
		<ul style="list-style-type: none"> Improve workers' ability to access switchgear during and in recovery phase of flood events 	
Transmission	Usage of high temperature low sag (HTLS) conductor on 16 miles of rebuild	<ul style="list-style-type: none"> Mitigate conductor sagging into vegetation during periods of sustained high temperatures 	Number of transmission trip-outs due to heat causing wires to sag into vegetation or distribution underbuild.
	Incremental hazard tree removals in existing corridor	<ul style="list-style-type: none"> Mitigate against outages caused by vegetation felled by high wind 	Number of transmission trip-outs due to trees in the identified sections where mitigation work was performed.

Participant Questions & Feedback

Questions

Comments

Feedback

Next Steps: Resilience Plan Feedback

- Through November 2023 (filing date):
 - Incorporate Feedback from today's session
 - Encourage comments by November 3rd
 - Record and incorporate feedback
 - Final Plan filed on November 21st

Working Group Next Steps

Climate Resiliency Working Group

- Central Hudson's Vulnerability Study was filed in Case 22-E-0222 on September 22, 2023 and a courtesy copy of the filed Study Report was sent with this meeting invitation.
- Looking ahead
 - Please provide any feedback from today's discussion, hopefully by November 3rd knowing that later feedback may not make it prior to the plan being filed.
 - Look for a courtesy copy of the Resiliency Plan to be sent via email after the filing.

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

