November 19, 2024

Versant Climate Study: Vulnerability Assessment and Resilience Strategies Overview

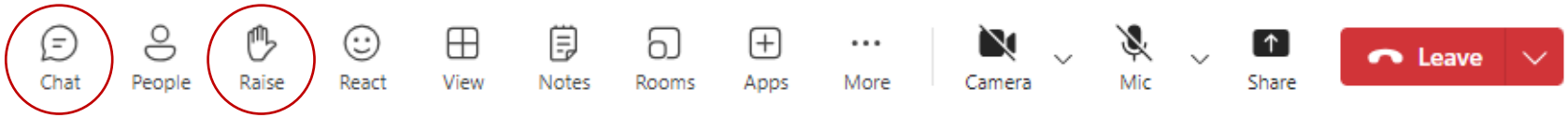
Meeting Logistics

Please ensure you are muted unless you are called on

The meeting is being recorded

Please provide your name, title, and affiliation

Feel free to ask questions or comment during the presentation using the chat feature or the raise hand function



****If you have technical difficulties or need assistance, please message Judy Long at judy.long@versantpower.com****

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Agenda

1. Welcome and Introductions
2. Project Background and Stakeholder Engagement Roadmap
3. Study Scope and Approach
4. Vulnerability Assessment Methodology and Results
5. Resilience Measures
6. Questions and Feedback
7. Next Steps

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Introductions

Add Versant's team photos, names, and titles

ICF's climate resilience team specializes in analyzing future climate scenarios, assessing climate risks, and building climate resilience for utility assets, operations, planning, design standards, and investments.

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Live Teams Poll

In a few words, how would you describe a **more resilient system**?

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Project Background

- The Climate Vulnerability Study is part of Versant's broader grid and climate planning efforts
- It follows the 2023 Climate Change Resilience Plan, which was required by An Act Regulating Utility Accountability and Grid Planning for Maine's Clean Energy Future
- The Maine Public Utilities Commission review of utility climate plans is outlined in Docket No. 2023-00282

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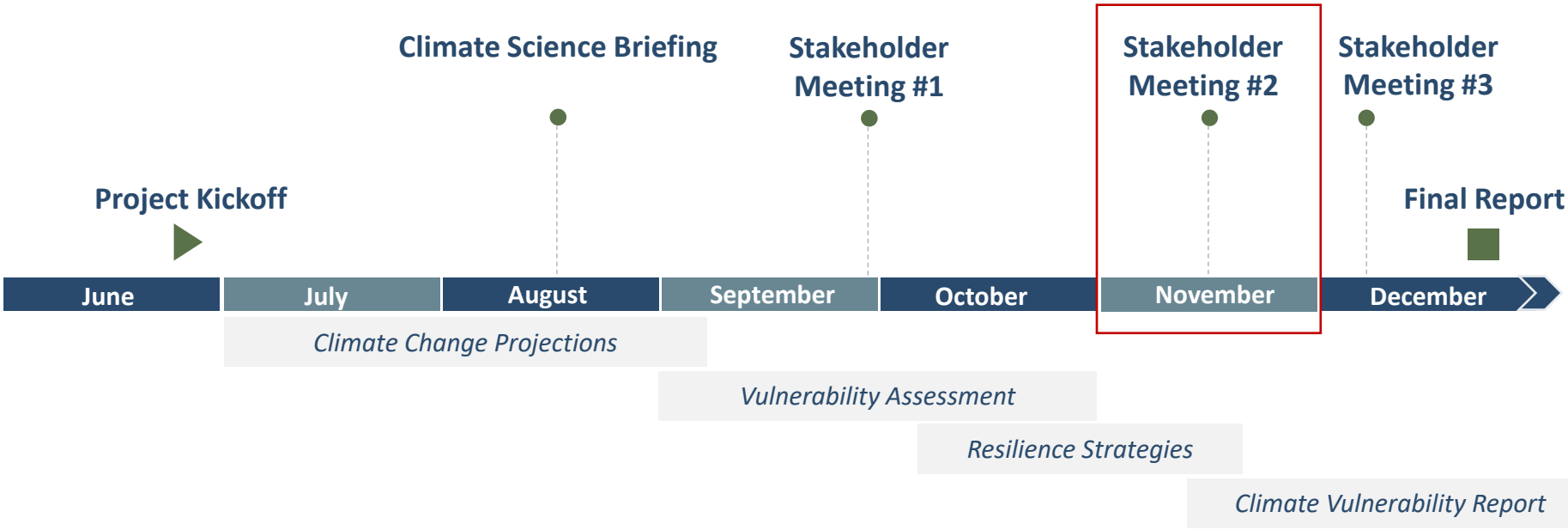
Versant's Climate Vulnerability Study and Stakeholder Engagement Roadmap



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Recap of Stakeholder Meeting #1

- Reviewed **climate change projections** for a range of possible outcomes, including extreme heat, heavy precipitation, coastal flooding, wildfire, and winter weather.
- By 2050, Maine could experience warmer temperatures, more frequent heat waves, more intense precipitation, a northward shift of frozen precipitation, less snowfall, increased flooding and wildfire risks, and a decrease in annual average wind speeds.
- **Extreme events** could include more frequent and intense thunderstorms, stronger hurricane winds, more severe wind events, and increased rain-on-snow occurrences, with potential shifts in flooding patterns and ice storm frequency.

Study Scope and Approach

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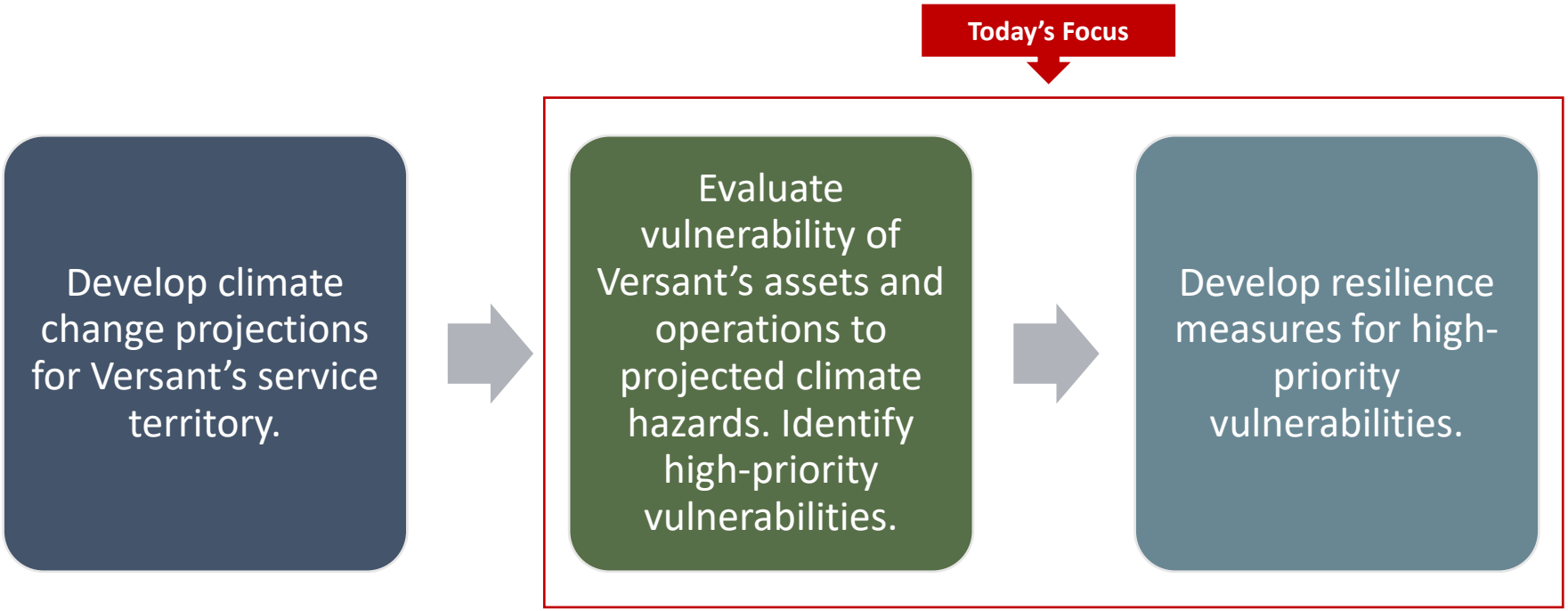
Overall Project Approach



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Climate Hazards Model

- Extreme Heat
- Winter Weather
- Wildfire
- Wind
- Heavy Precipitation and Inland Flooding
- Coastal Flooding
- Extreme Events (analyzed from literature)

Climate Scenarios:

- Moderate emissions: SSP2-4.5
- High emissions: SSP5-8.5

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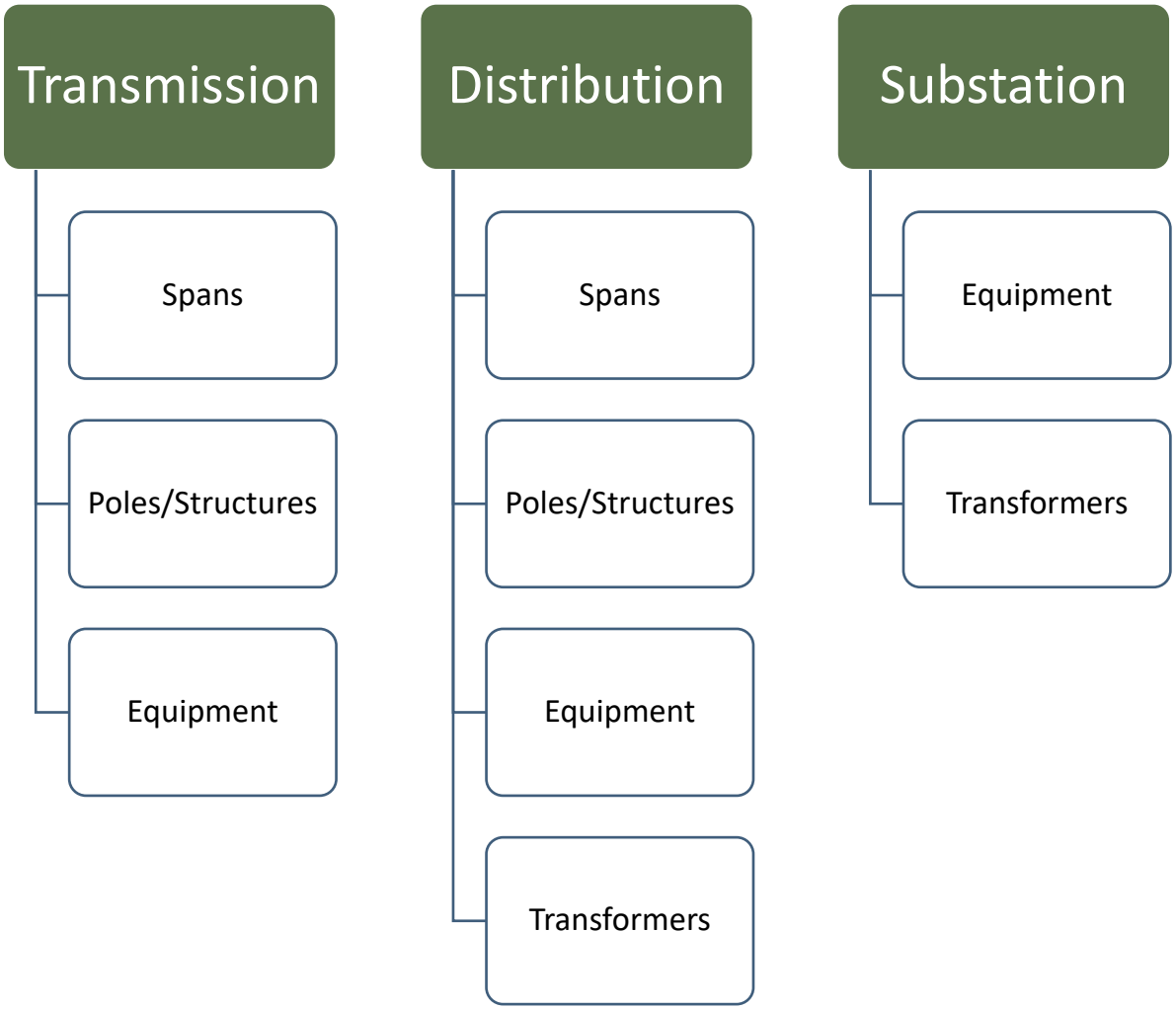
In-Scope Assets



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Participating Departments

- Vegetation Management
- Environmental
- Facilities
- Asset Management / T&D Planning
- Communications, Legal & Regulatory Affairs
- Emergency Response
- System Operations
- Workplace Safety

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Vulnerability Assessment Methodology

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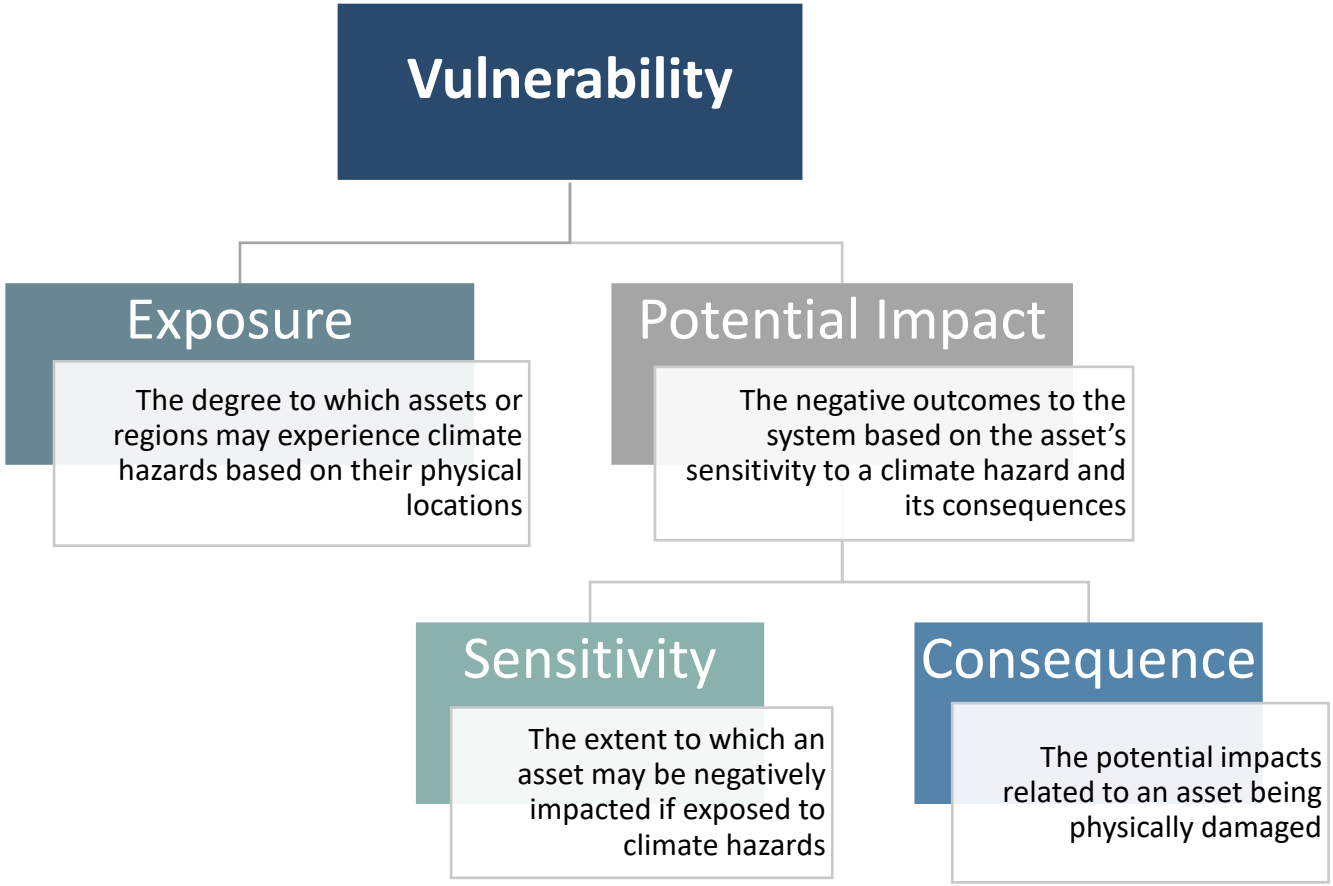
Approach to Assessing Asset Vulnerability



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Sensitivity

- Scored on the 1-5 scale
- Customized rubrics for each asset that captures key asset attributes based on current conditions
- Types of data used: Installation year, health index, pole type
- Scores reflect current system conditions and do not account for future changes

	Transmission & Distribution Spans	
Thresholds	Installation Year	Sensitivity Score
	2016-Present	1
	2006-2015	2
	1996-2005	3
	1986-1995	4
	1985 and prior	5

	Transmission & Distribution Regulators and Reclosers, Substation Equipment and Transformers	
Thresholds	Health Index	Sensitivity Score
	91+	1
	71-90	2
	51-70	3
	31-50	4
	30 and below	5

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Consequence

- Scored on the 1-5 scale
- Customized rubric based on scores developed by Versant
- Scores reflect the number of customers served by the asset or the asset's voltage
- Scores reflect current system conditions and do not account for future changes

	All Assets	
Thresholds	*Risk Score*	Consequence Score
	0-500	1
	501-3,500	2
	3,501-5,000	3
	5,001-10,000	4
	10,001-20,000	5

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Exposure

- Scored on the 0-5 scale
- Customized rubrics were developed for each climate hazard using climate projections developed for Versant, information from past vulnerability and risk assessments across North America, and information from Versant SMEs on the Company's risk tolerance.

Example

	Extreme Heat			
Weighting	50%		50%	
Thresholds	Days with maximum temperature above 30°C (86°F)	Exposure Score	Number of 2+ day heat waves per year exceeding daily max temperature 86°F	Exposure Score
	0-5 days	0	0-2	0
	5-10 days	1	2-4	1
	10-15 days	2	4-6	2
	15-20 days	3	6-8	3
	20-30 days	4	8-10	4
	30+ days	5	10+	5

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Vulnerability Assessment Results

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Vulnerability Results - 2050 Averages

Asset / Hazard	Extreme Heat	Winter Weather	Wildfire	High Winds
Transmission Spans	36.28	5.01 (11.25)	26.18	34.48
Transmission Poles	--	4.54 (9.46)	36.27	30.12
Transmission Equipment	26.55	1.84 (6.28)	19.46	--
Distribution Spans	--	2.00 (4.73)	--	14.52
Distribution Poles	--	1.70 (3.77)	--	10.87
Distribution Transformers	--	1.10 (3.95)	--	--
Distribution Equipment	--	1.14 (3.28)	--	--
Substation Transformers	21.78	--	--	--
Substation Equipment	16.02	--	--	--

Note: Asset-hazard combinations were selected based on Versant's 2023 Climate Change Resilience Plan and Subject Matter Expert input. Vulnerability scores are averages for 2050.

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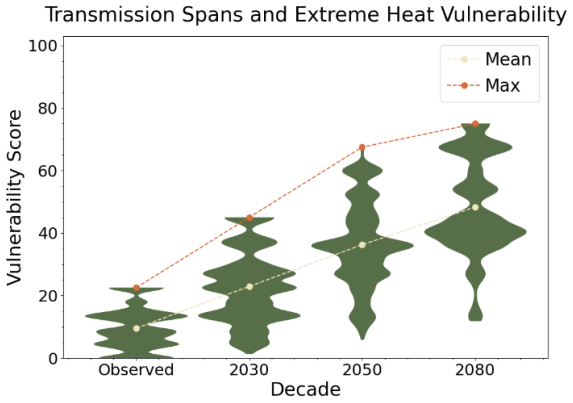
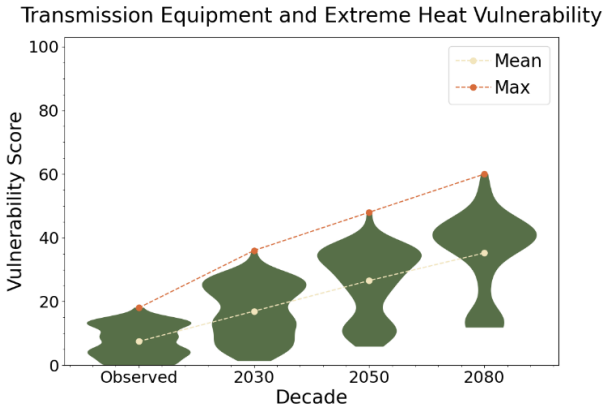
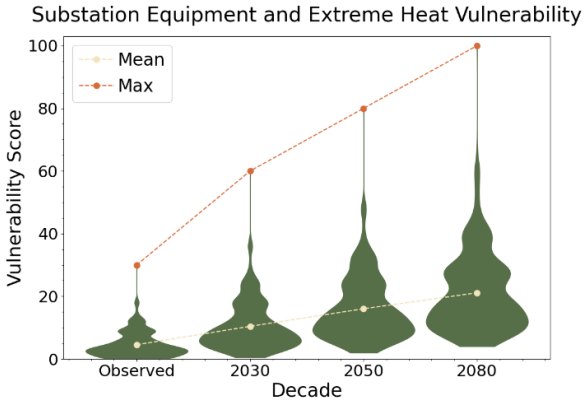
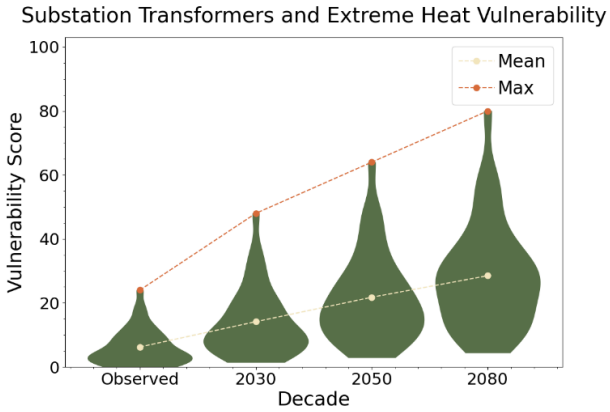
Extreme Heat

- All assets have **increasing** vulnerability to heat
- **Transmission spans** have the highest average vulnerability
- Implications: Mechanical stress, reduced conductor clearance, accelerated aging









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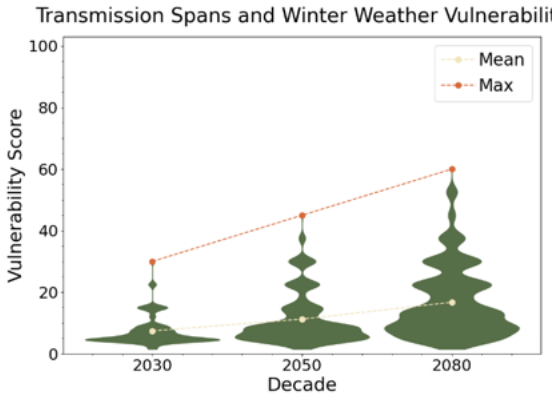
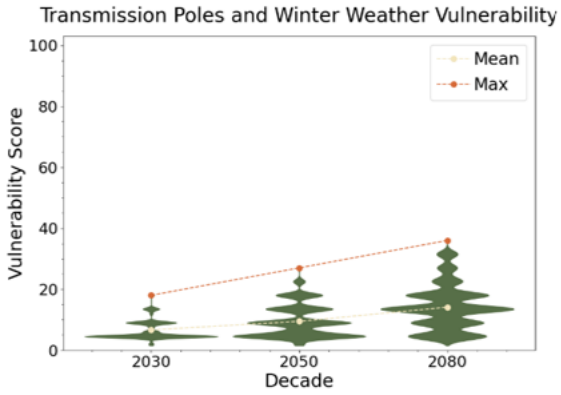
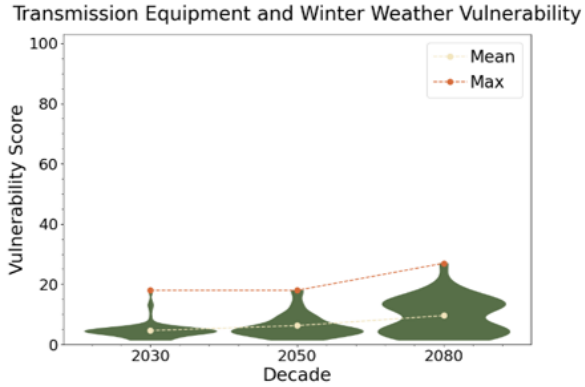
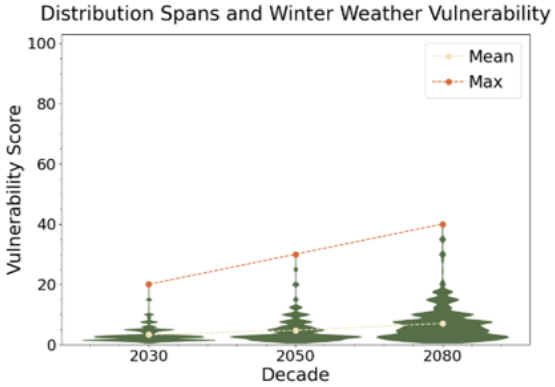
Winter Weath

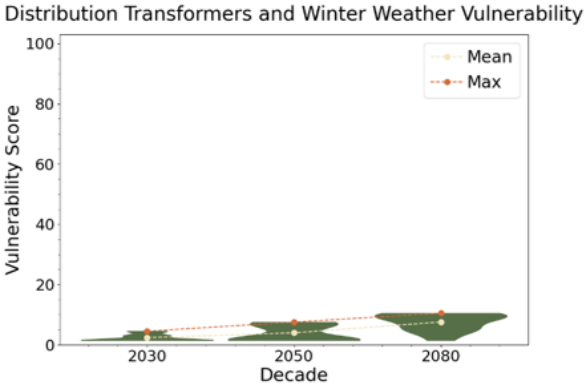
- **56%** of assets have score of 0 due to winter weather projected to decrease in certain areas
- **Transmission spans** have the highest average vulnerability
- Implications: Increased risk of failure from ice loading and extreme cold

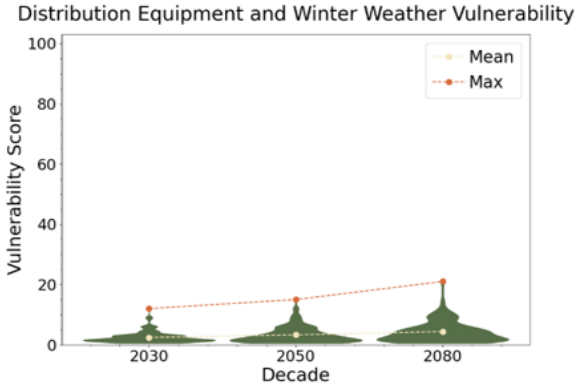












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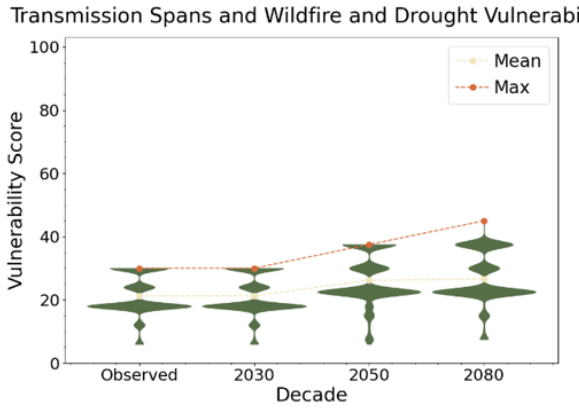
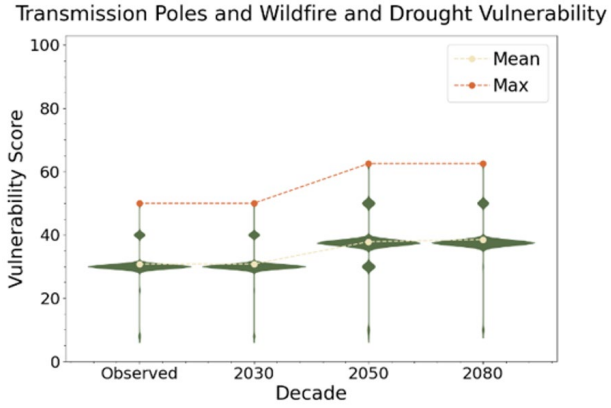
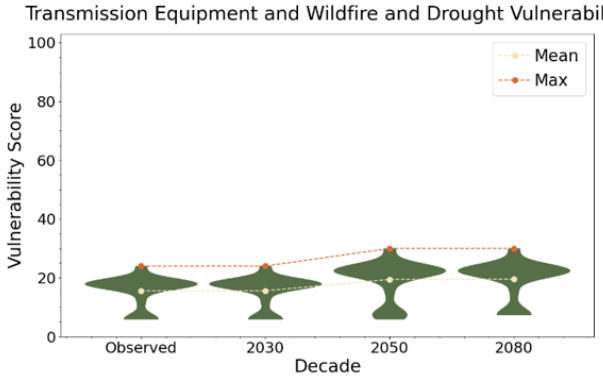
Note: Scores of 0 have been removed from the above plots

Wildfire

- **Relatively constant** vulnerability, with slight increase in 2050 and 2080
- **Transmission poles** have the highest average vulnerability
- Implications: Significant structural damage, flashovers







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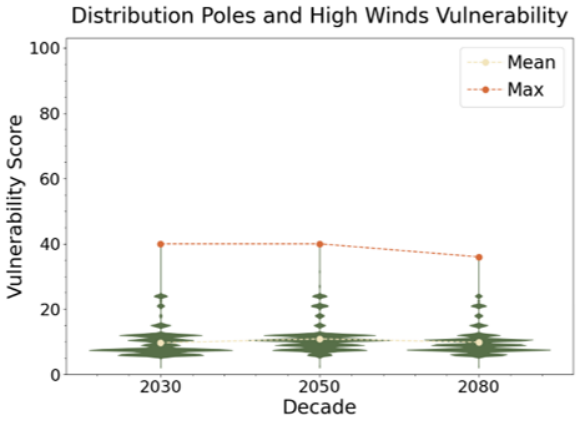
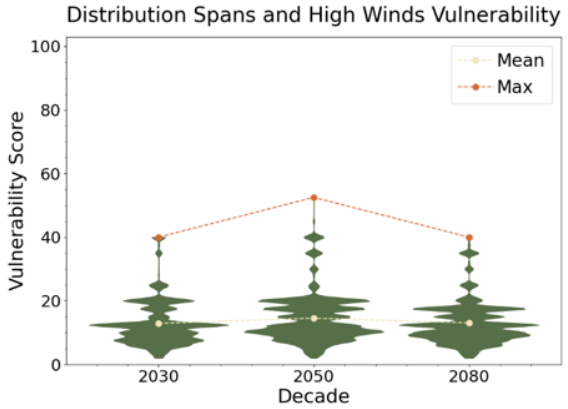
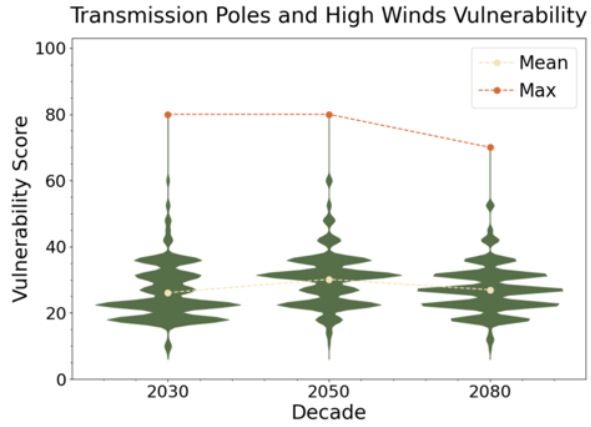
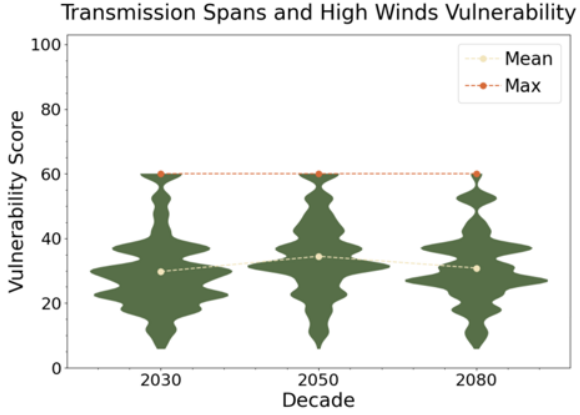
Wind

- **Relatively constant** vulnerability, with peaks in 2050
- **Transmission spans** have the highest average vulnerability
- Implications: Line detachment, structure collapse
- These represent projections of average daily windspeed; winds associated with storms are likely to increase in intensity, but are more difficult to model.









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Note: Asset-hazard combinations were selected based on Versant's 2023 Climate Change Resilience Plan and Subject Matter Expert input. Vulnerability scores are averages for 2050.

Did any of the vulnerability results surprise you? If so, which ones and why?

Are there any particular areas or assets that you feel are especially vulnerable to climate change?

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Resilience Measures

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Recent and Ongoing Resilience Efforts

- Proactive resilience programs to enhance electric service reliability across Versant's service territory.
- **2018 -** Reliability and Resilience Improvement Plan:
  - Investing **$30M+ annually** in resilience programs since 2018.
- **2023 -** Climate Change Resilience Plan
- **October 2024 -** Awarded a **$65M grant** for the Flexible Interconnections and Resilience for Maine (FIRM) project in partnership with the Maine Governor's Office and Central Maine Power.
  - Aims to strengthen grid stability and improve grid management statewide.

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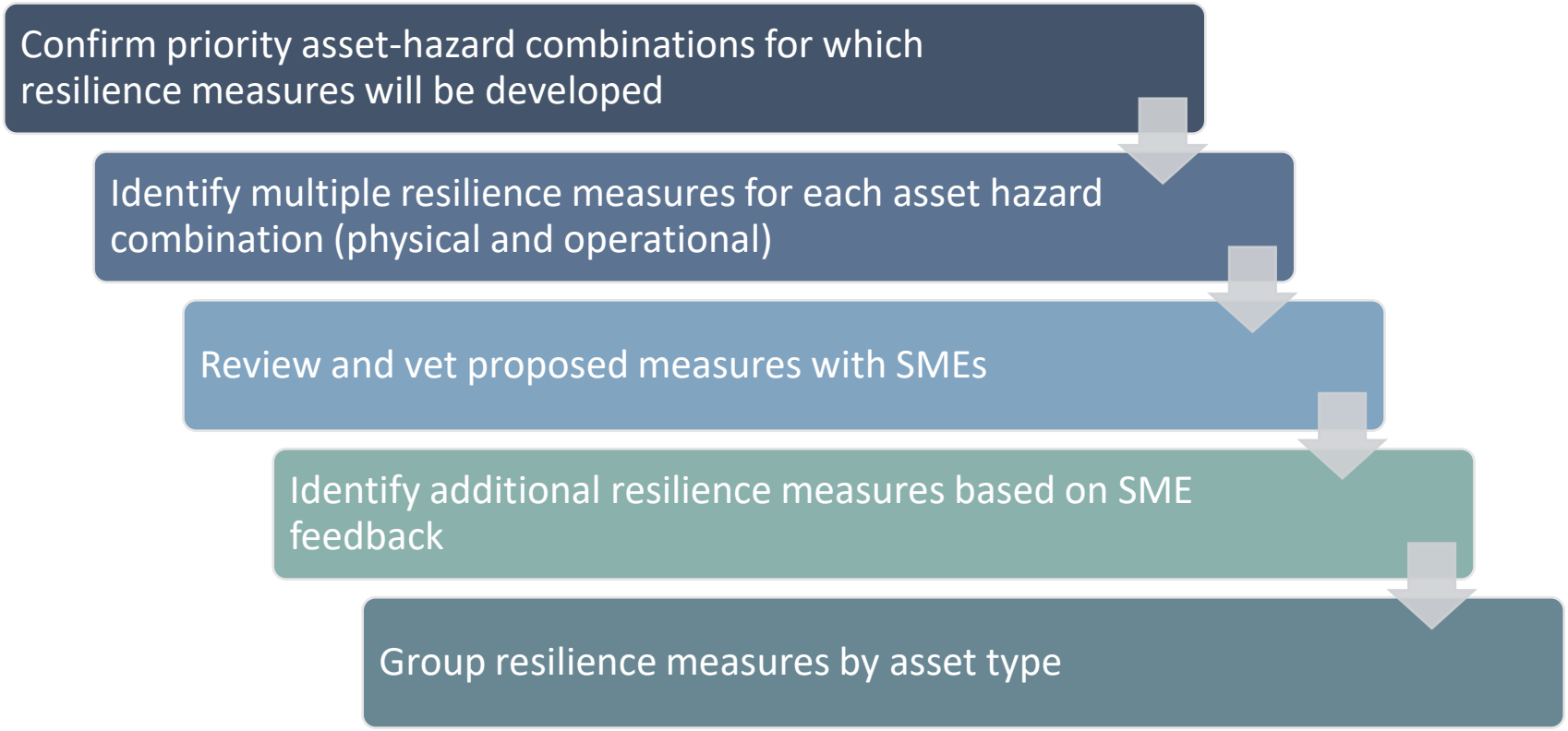
Process for Identifying Resilience Measures



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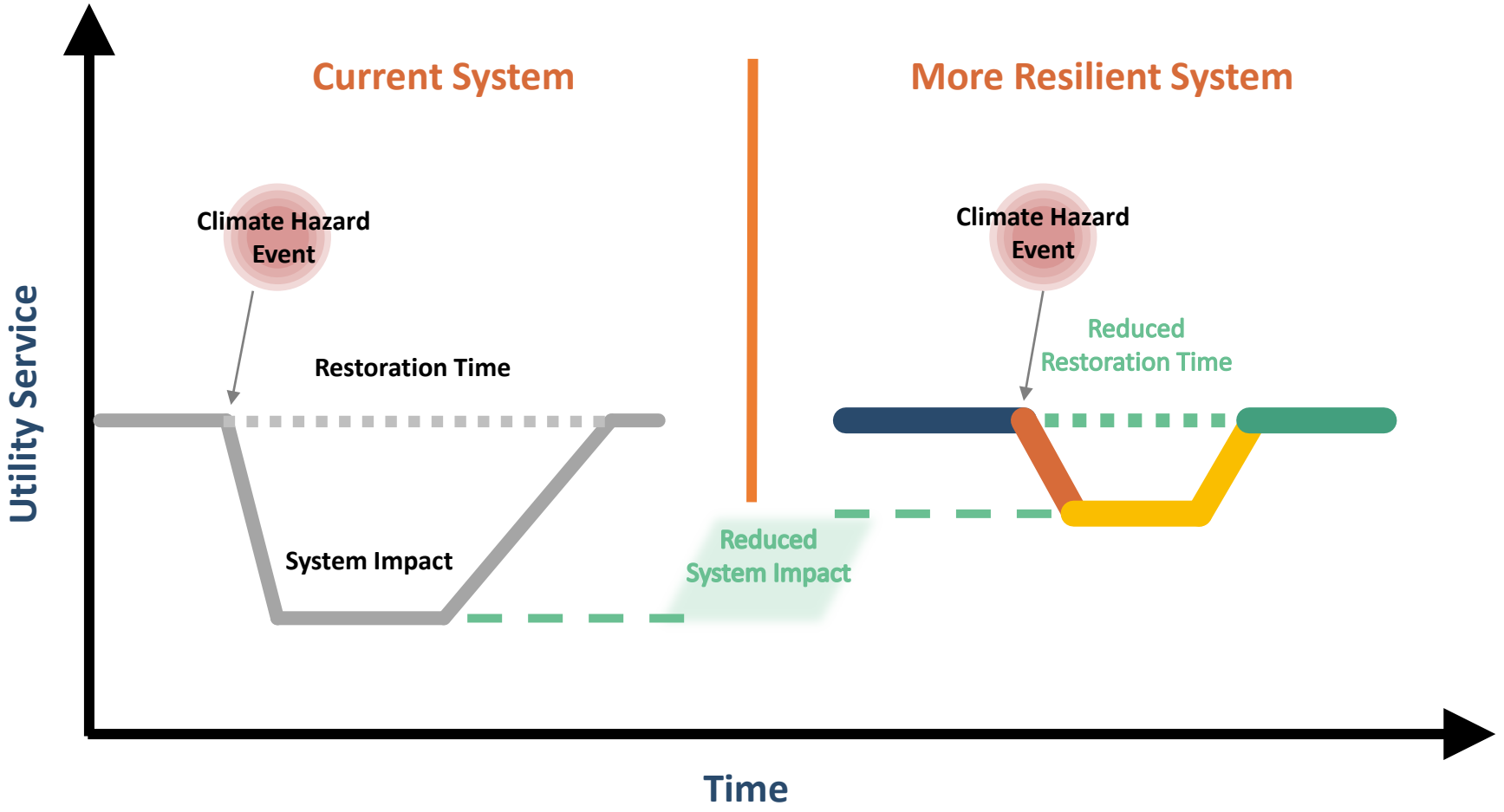
Resilience Framework



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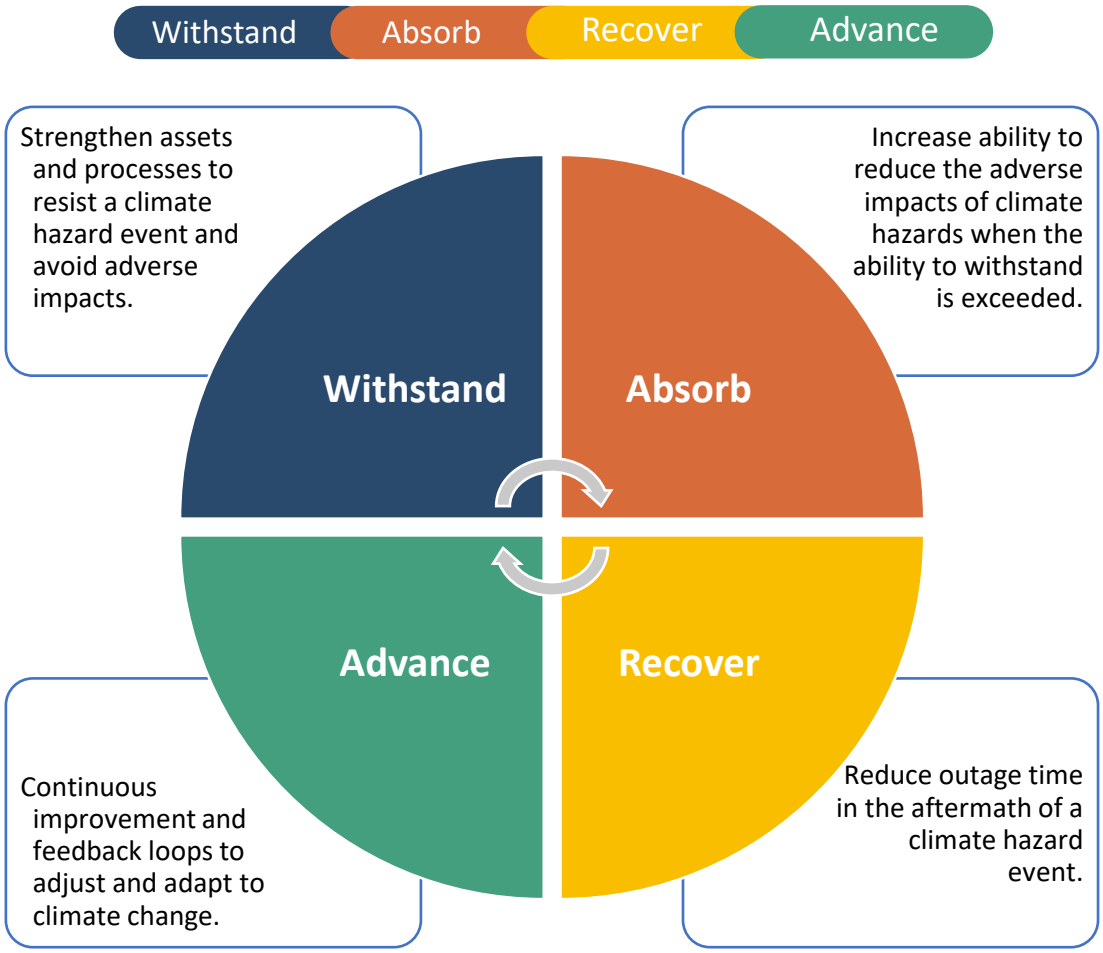
Withstand | Absorb | Recover | Advance

Resilience Framework



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Example Resilience Measures

Framework Dimension	Example Measures	Asset Types	Hazards Addressed
Withstand	• Targeted undergrounding • Increase transmission corridor widths to prevent tree contact	Transmission Spans, Distribution Poles	Wildfire, Wind, Winter Weather
Absorb	• Targeted backup battery or microgrid deployment • Install additional cooling mechanisms to maintain equipment temperatures	Distribution Spans and Poles, Substation Equipment	Heat, Winter Weather, Wind
Recover	• Increase spare inventory and further develop supply chain agreements for critical assets • Implement fault location, isolation, and service restoration (FLISR) scheme	Transmission Spans and Structures, Transmission Equipment, Distribution Spans and Poles, Distribution Equipment, Substation Equipment	Wildfire, Winter Weather, Wind, Heat
Adapt	• Upgrade design standards to utilize higher capacity equipment • Use satellite imagery, LiDAR and AI/ML for targeted vegetation management	All assets	All hazards

- ☑ Multi-hazard and multi-asset impact
- ☑ Combination of short- and long-term solutions
- ☑ Asset-focused and operational strategies mix
- ☑ Leverage innovative technology
- ☑ Produce multiple benefits
- ☑ Engage variety of stakeholders

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Considerations for Evaluating and Prioritizing Resilience Measures

Efficacy	Ability to address multiple hazards/ vulnerabilities	Cost	Stakeholder support
Implementation feasibility	Synergies with other programs/priorities	Availability of external funding	Enhanced organizational capabilities

What factors should be taken into account when evaluating and prioritizing resilience measures?

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Additional Discussion Questions

What improvements or changes would you like Versant to consider for the next study update in three years?

What additional information or resources would be most helpful?

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Next Steps: What to Expect

- Invitations for the third stakeholder session will be sent out soon.
- The next stakeholder session is scheduled for December and will focus on reviewing the draft report.
- All materials will be available on the company website.
- Please send any questions to gridandclimate@versantpower.com

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Integrated Grid Planning Stakeholder Meetings

Held meetings with sustainability staff with the Mi'kmaq, Passamaquoddy and Penobscot tribes
Stonington/Deer Isle community meeting held on 9/25
Ellsworth community meeting held on 10/1
Bar Harbor community meeting held on 10/8
Blue Hill community meeting held on 10/15
Machias community meeting held on 10/22
Eastport community meeting held on 10/23
Cherryfield community meeting held on 10/29
Milo community meeting scheduled for 11/19
Indian Island community meeting scheduled for January 2025

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Thank You!