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How to Address Power Outage Inequity in Connecticut

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Recent climate scenarios indicate that damaging wind gusts, especially in winter, are projected to intensify across northern and central Connecticut, increasing the likelihood that cold snaps and power loss coincide. Predictive modeling suggests these hazards occur in the same places that already experience long outages and slow recovery, producing compounding risk. In several coastal municipalities, historically rare events (e.g., ~1-in-50-year) associated with intense storms are predicted to recur more frequently, implying a higher rate of disruptive storms in the future. At the same time, increasing heat wave incidence in cities raises concerns about potential system instabilities caused by elevated cooling demand. When combined with the construction of AI-class facilities, these trends emphasize the need for carefully designed safeguards and infrastructure that can adapt to growing demand. State leaders and agencies have new regulatory and funding tools that can direct resources to support the communities most vulnerable to outage impacts.

Communities Impacted by Climate Disaster and Power Loss

With funding from the U.S. Department of Energy Grid Deployment Office, researchers from the University of Connecticut, in collaboration with the State University of New York at Albany, have created a comprehensive Grid Resilience Analysis and Climate Change Impacts (GRACI) guide. This guide identifies where and for whom climate-driven hazards are most likely to cause prolonged outages and turn evidence into practical investment guidance.

Low-income and other marginalized households often experience longer and more frequent power outages. Our analysis of where and why outages have historically occurred supports this conclusion. It identifies persistent outage “hotspots,” many of which also register high values on a Connecticut Social Vulnerability Index. This index is a composite measure of socioeconomic, demographic, housing, health, and mobility conditions that can reduce a community’s capacity to prepare for, withstand, and recover from hazards. This implies that socioeconomically vulnerable households, including low-income, minoritized, and otherwise underserved residents disproportionately endure the longest and most frequent interruptions. Customer-survey evidence reinforces this finding.

Specifically, our evidence reveals that lower-income households (e.g., <$50,000) exhibit the highest annual willingness to pay for reductions in outage frequency and duration, consistent with heightened exposure and limited coping capacity. This signals that outages impose greater burdens on households with fewer coping resources, limited savings, less access to backup power, and fewer alternatives when electricity-dependent services fail. High-income households (>$200,000) also show relatively high willingness to pay, however, this likely reflects productivity concerns and stronger expectations for uninterrupted service, whereas middle-income groups often exhibit lower or statistically insignificant willingness to pay, plausibly due to prior private preparedness (e.g., generators, batteries). Collectively, these findings support a shift from uniform, system-

wide resilience improvements toward place- and population-specific solutions.

Investing in Connecticut's Climate and Energy Safety

Power outage risk is very uneven across the system, so it is important to focus on upgrades where they will have the biggest impact. Our analysis suggests that combining practical measures such as better tree trimming, putting the most vulnerable lines underground, adding smart switches, and building microgrids in key locations can cut major outages by two to three times and make the average event about 30% smaller. Additionally, Connecticut's investment in its future as it faces critical climate challenges must include:

- Further developing statewide outage forecasting, measuring progress, and ensuring public accountability, including supporting emergency response strategies in preparation for future extreme weather events

- Targeting investments to circuits under highest risk, deploying adaptive microgrids in high priority areas to maximize restoration capabilities and backup power access, and strategically reallocating restoration crews in high-risk regions during outage events

- Integrating outage models into utility and public grant filings to justify spending, and aligning planning, funding, and equity metrics

These proposed actions support current state policy directions, including the Public Utilities Regulatory Authority's shift to performance-based regulation and the Department of Energy and Environmental Protection's expansion of the 2025 Climate Resilience Fund. All communities in Connecticut deserve a resilient and well-prepared state as we continue to navigate a climate crisis.