A Framework for Wildfire Resilience for Utility Planning in the Western Interconnection

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INTRODUCTION AND RESEARCH LITERATURE

Wildfires are a growing hazard in many regions of the US, escalating in both frequency and severity over the recent years (Thurman, 2022). Power systems have been shown to significantly intersect with wildfire risk, impact, and response. Power lines can cause wildfires while pre- and post-event power loss can affect wildfire response and recovery (Liu, et al, 202; Vasquez, et al, 2022; Panossian et al, 2022; NREL 2024). Integration of energy resilience strategies into community level recovery and mitigation planning holds the promise to promote both wildfire and energy resilience in an integrated and coordinated fashion.

While research that explores the intersection of energy and wildfire planning has grown in the last few decades (see Fig. 1) the extent to which energy resilience is actually being integrated into post-fire recovery at various stakeholder levels is largely unknown. This study fills the gap by investigating available integrative strategies and by shedding light whether these strategies are actually being adopted on ground.

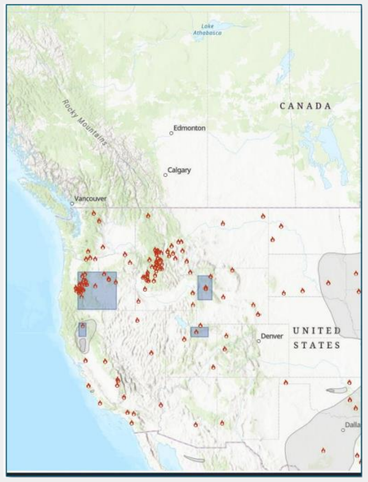


Figure 1: current Wildfire Conditions (WECC, 2024)

RESEARCH GOALS AND OBJECTIVES

This study aims to explore strategies that can be used to integrate energy and wildfire resilience at the utility-, community- and household level. Specifically, it asks:

1. What strategies are available to households, communities and private utilities to pursue energy-wildfire resilience?
2. What strategies are actually being implemented on ground by these actors in the western United States.

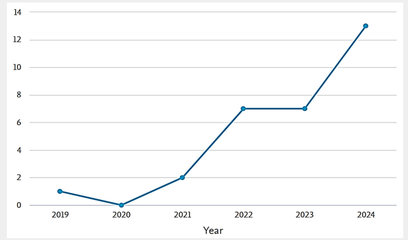
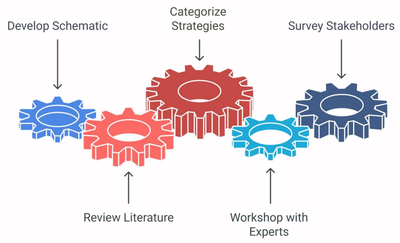


Figure 2: The number of Documents published on Scopus containing keywords "Wildfire Resilience" and "Power Systems" (Scopus, 2024)

METHODOLOGY



In Phase 1 (presented here), we extract programs from utility providers, authoritative resources, and academic literature, categorizing them into mitigation strategies. These strategies are then grouped into broader categories and validated through expert workshops.

In Phase 2, we will survey utility providers to assess their adoption of these strategies. The online survey, using purposive sampling, will provide insights into on-the-ground mitigation efforts and inform the process for other stakeholders, including communities and households.

RESULTS AND RESEARCH PROGRESS

- ◆Expanded Framework – Initial broad strategy categories were refined into a structured, mutually exclusive system as the figure shows.
- ◆ Utility-Level Focus – Most existing strategies prioritize utility providers over community or household resilience.
- ◆ Enhanced Clarity – Developed precise definitions for each strategy to improve usability.
- ◆ Strategic Gaps Identified – Under-documented strategies, particularly at community & household levels, need further research.

IMPLICATIONS FOR RESEARCH AND PRACTICE

- Expansion of methodology and data sources

Results from this research address key questions and expand on methodology and data sources. The data collected will benefit researchers and policymakers focused on wildfires and power system resilience.

- Identifying gaps in recovery plans:

The categorization of resilience strategies can highlight gaps in current recovery plans, helping policymakers adopt more comprehensive approaches.

- Improving energy resilience integration:

The assessment of energy resilience in wildfire recovery plans offers valuable insights for better resource allocation and plan development.

NEXT STEPS: ADOPTION ASSESSMENT (SURVEY)

- Survey utility providers to assess strategy adoption rates and barriers to implementation.
- Identify gaps in mitigation and adaptation strategies based on industry feedback.
- Use survey results in an iterative process to develop a similar framework for community and household-level stakeholders.

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