

Quantification of social vulnerability to power outage: PCA-AHP Vs. SoVI and CDC SVI

Thursday, October 23, 2025 11:00 AM (20 minutes)

PSPS (Public safety power shutoff) is an emerging and commonly utilized strategy for mitigation of wildfire threats to safe operations of power systems. PSPS typically aims to cut down the supply of electricity in an area experiencing high wildfire risks to avoid fires sparked by power devices. Vulnerable populations who depend on the availability of electricity have not been studied when PSPS decisions are made. This study aims to bridge this gap and conduct a comprehensive social vulnerability analysis of the planned power outages in California, in which diverse social and socioeconomic status, community and neighborhood, race and gender, and health will be considered. In comparison with traditional inductive or hierarchical social vulnerability index (SVI) analysis, this study develops an integrated principal component analysis and analytical hierarchical process (PCA-AHP) SVI method, considering experts' knowledge into the computation of PCA-AHP SVI, in addition to people with health issues to be more vulnerable during a power cut-off period. The results uncover spatial patterns of vulnerable social groups in historical PSPS areas, which suggests that PCA-AHP is a more informed, practicable, and equitable approach for safety power outage shutoff, which integrates social vulnerability analysis and wildfire risks into safety power system protection.

Is there a SINGLE day you are unavailable to present?

October 25, 2025

Is there a time of day you are unavailable to present?

Organized Session Details

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