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Responding to Natural Catastrophes – New Models and Approaches

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TO: California Earthquake Authority (CEA)

California faces a convergence of escalating wildfire risk, rising insurance premiums, expanding utility liability exposure, and growing pressure on ratepayers and local governments. While significant progress has been made in utility mitigation, fuels management, and adoption of new detection technologies, the state's current wildfire-financing structure remains misaligned with the physical and financial risks of climate-driven disasters, including both ignition risk and the accelerating consequences of fire spread. To meet this challenge, California must adopt a more cohesive and risk-responsive catastrophe framework that elevates mitigation, improves transparency, strengthens affordability, and enhances operational coordination across agencies and sectors.

Drawing from Filsinger Energy Partners' ("FEP") extensive experience supporting utilities in wildfire risk modeling, infrastructure assessment, vegetation inspections, and mitigation planning, this paper outlines a forward-looking model for California's next generation of catastrophe strategy. Central to this proposal is the creation of a Statewide Operational Observer, an independent oversight function designed to ensure that the recommendations emerging from the CEA's SB254 Natural Catastrophe Resiliency Study ("SB 254 Study") translate into consistent statewide implementation and measurable risk reduction.

1. ***Reimagining the Catastrophe Financing Framework: "Wildfire Fund" to "Catastrophe Fund"***
   The existing Wildfire Fund was developed to stabilize the utility sector and support victim compensation following utility-caused ignitions. While effective in certain respects, it is not aligned with the broader landscape of catastrophe risk. Wildfire now intersects with drought, flood, wind, and extreme heat – hazards that collectively shape California's loss potential.

   FEP supports transitioning from a single-hazard, utility-focused mechanism to a comprehensive, multi-party Catastrophe Fund that reflects the full range of natural hazards and shared responsibilities required to manage them. A broader fund structure would:

1) improve response and compensation for all disaster types;
2) diversify funding beyond utilities and ratepayers;
3) increase the size of the fund to improve response capability; and
4) lower insurance costs by functioning as a form of reinsurance

This structure better reflects the interconnected nature of catastrophe risk and would enable California to engage in proactive, rather than reactive, resiliency planning. Funding could potentially come from a wide range of stakeholders, including the state, the federal government, utilities, and insurance companies.

2. ***Building a Holistic Statewide Vegetation Management (VM) Strategy***

Increasing wildfire consequences are driven by high fuel loads, reduced clearing and controlled burns, vegetation drying under climate change, and expanding housing in Wildland Urban Interfaces ("WUI") and High Fire Threat Districts ("HFTD"). A statewide strategy can leverage utility, state, and federal resources to better address these conditions.

Tree mortality illustrates this urgency. Some of California's largest and deadliest fires occurred in areas of high tree mortality[1], and projected climate change impacts will further elevate fuel-driven fire behavior. The southwestern U.S., now in the second driest megadrought since 800 CE[2], underscores the need for integrated fuel-treatment and hardening strategies. Elevated mortality also increases vulnerability to storms, windthrow, and post-fire flooding, reinforcing the need for an all-hazards approach. This would allow for fuel treatment to minimize consequence in the form of fire spread versus only treating ignition likelihood.

3. ***Advancing Technology-Enabled Infrastructure Monitoring***

Preventing ignitions and limiting spread requires rapid detection and response, underscoring the importance of continued investment in advanced monitoring technologies. Continuous monitoring, real-time sensors, and supporting telecommunications infrastructure allow utilities to proactively identify equipment anomalies and detect ignitions within seconds. Early situational awareness narrows the response window, reducing fire growth rates and substantially lowering downstream consequences, making systemwide monitoring an effective way to reduce both ignition frequency and the consequences of undetected equipment degradation.

[1] For example, the 2018 Camp Fire and the 2021 Dixie Fire, both of which burned in regions with extensive tree mortality and accumulated fuels.

[2] H. Eagleston et al., Systemic Drivers of Electric-Grid-Caused Catastrophic Wildfires: Implications for Resilience in the United States, *Challenges* 16, no. 1, Feb. 2025, at 13, https://doi.org/10.3390/challe16010013.

4. ***Strengthening Emergency Response & Situational Awareness***
   Artificial intelligence ("AI") camera networks have significantly improved CAL FIRE's ability to rapidly detect and respond to ignitions. Coverage, however, remains inconsistent across utilities, creating avoidable visibility gaps. Expanding AI camera deployment statewide, perhaps operated by the California Governor's Office of Emergency Services ("Cal OES"), can reduce response time, lower consequence and suppression costs, and improve coordination across agencies during high-risk conditions.

5. ***Modernizing Building Codes & Community-Level Mitigation***
   California's long-term resilience depends on strengthening building codes and expanding access to wildfire-hardened home and community designs, particularly in high-risk areas where dense housing enables rapid structure-to-structure fire spread. Modernized building codes and practical retrofit options can significantly reduce wildfire-related structural losses while preserving curb appeal and property value. The state, utilities, and local partners can jointly produce and distribute design templates that incorporate ember-resistant materials, ignition-resistant landscaping, and defensible-space principles. Providing these resources together with accessible retrofit support would reduce damage risk and strengthen insurance affordability through measurable vulnerability reductions.

6. ***Enhancing Natural Catastrophe Modeling Across Hazards***
   California would benefit from a coordinated, statewide effort to advance urban conflagration modeling and integrate wildfire models into a broader multi-hazard framework that includes wind, flood, extreme heat, seismic hazards, and cascading climate impacts. As these hazards intensify and interact, siloed modeling approaches limit the state's ability to understand compound risk or design future-proof standards for infrastructure and communities.

   A multi-hazard framework should incorporate scenario-based projections under multiple climate pathways[3] to evaluate how emissions trajectories influence hazard frequency, severity, and exposure. Modeling hazards holistically within a consistent risk architecture would help the state evaluate cumulative consequences and make transparent tradeoff decisions. This proposed framework should leverage advanced methodologies used by utilities, land-management agencies, public safety partners, and research institutions to create an ensemble modeling approach capable of capturing wildfire tail-risk behavior alongside flood, storm, seismic, heat and other climate-driven consequences.

   Advancing this multi-hazard modeling capability requires transparent, interpretable tools that allow utilities and agencies to understand, test, and validate assumptions driving risk outputs rather than relying on opaque black-box solutions. Transparency enables cross-utility

[3] For example, Shared Socioeconomic Pathways ("SSP") and Representative Concentration Pathways ("RCP"), which model alternative climate and emissions futures commonly used in global and state-level risk assessments.

comparability, strengthens regulatory defensibility, and helps stakeholders identify the drivers of risk – whether ignition likelihood, exposure conditions, or consequence scaling. Robust catastrophe modeling must integrate data-science with physical, fire, hydrological, and meteorological sciences; without the ability to test assumptions in each domain, models risk producing misleading outputs with operational consequences.

Transparent, multi-hazard modeling architecture is therefore essential for building a statewide risk framework that is credible, repeatable, and aligned with scientific realities shaping California's evolving hazard environment.

7. Establishing a Statewide Operational Observer ("SOO")

Implementing these recommendations requires a dedicated entity responsible for overseeing operational deployment, aligning agency efforts, and maintaining statewide situational awareness. The proposed SOO would serve as a neutral, independent function ensuring consistent implementation of SB 254 Study recommendations and related catastrophe-resilience initiatives.

The SOO's core functions would be to monitor, evaluate, coordinate, and provide necessary transparency and reporting. Large investor-owned utilities ("IOUs")[4] and publicly owned utilities ("POUs") operate under distinct regulatory structures, governance models, and cost-recovery mechanisms, resulting in uneven risk-mitigation capacity and significant variation in risk exposure across the state. An independent observer would help identify critical gaps, elevate best practices, and provide operational support to utilities whose resources or governance structures limit their ability to implement IOU-level mitigation programs.

IOUs operate under a California Public Utility Commission ("CPUC")- and Office of Energy Infrastructure Safety ("OEIS")-regulated framework with prescriptive wildfire-mitigation requirements and mandatory Wildfire Fund participation.[5] By contrast, POUs operate under local-governance authority that provides self-certification pathways and distinct statutory responsibilities not subject to CPUC approval.[6] These structural differences shape operational practices and risk-mitigation strategies across the state, influencing resource deployment, inspection cycles, technology adoption, and vegetation management practices.

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[4] California's three large IOUs subject to this regulatory framework are Pacific Gas & Electric Company (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E).

[5] IOU wildfire mitigation plan requirements and CPUC/OEIS oversight are established in Cal. Pub. Util. Code § 8386 (as amended by SB 254, Chapter 119, Statutes of 2025), Senate Bill 901 (2018), and Assembly Bill 1054 (2019). The California Wildfire Fund structure and IOU participation requirements are set forth in Cal. Pub. Util. Code Part 6 (commencing with § 3280).

[6] POU wildfire mitigation plan requirements and self-certification processes are governed by Cal. Pub. Util. Code § 8387. POUs operate under local-governance authority established by the California Constitution, which grants them autonomy over municipal affairs including utility operations.

The SOO's role, therefore, is not to impose a single uniform standard across all utility types but to provide a differentiated yet actionable operational lens – one that recognizes regulatory asymmetry while still enabling statewide coordination where it meaningfully improves resilience. In practice, this means the SOO would calibrate expectations and evaluation criteria by utility category, apply consistent methodologies where aligned with existing statutory authority, and facilitate structured data and knowledge exchange that enhances visibility without undermining local governance prerogatives.

By identifying implementation gaps within and across both POUs and IOUs, and by clarifying where targeted support, guidance, or alignment is needed, the SOO would help California translate policy direction into real-world performance. It would also provide decisionmakers with clear, independent insight into how the state's diverse utility ecosystem contributes to, or is constrained within, the broader catastrophe-readiness posture.

FEP is in a unique position to contribute to the end-to-end process required to build this framework and foster a collaborative partnership with all stakeholders.

Sincerely,

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